

# The Pauropoda and Symphyla of the Geneva Museum IV. A basic list of the Pauropoda of Greece (Myriapoda)

by

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With 30 figures

## ABSTRACT

The present study is a review of the Pauropoda of Greece, their distribution and taxonomy. It is based upon earlier literature records and a rich collection assembled in the Geneva soil zoology project led by Dr Bernd Hauser.

Thirty species are listed. They belong to 3 families: Pauropodidae with 7 genera and 25 species, Brachypauropodidae with one genus with one species and Eurypauropodidae with 2 genera and 4 species.

Eight species are new to Greece, one of them also new to science. The latter, *Hemipauropus hauseri* n.sp., is described. It has been placed in a new subgenus, *Multipauropus* n. subgen., and consequently the genus *Hemipauropus* is split into two subgenera, *Hemipauropus* s. str. and *Multipauropus* n. subgen.

The composition and distribution of the Greek Pauropoda indicate that they might belong to several zoogeographical elements with different origin.

## 1. PREVIOUS KNOWLEDGE OF PAUROPODA IN GREECE

From the work of many collectors the Pauropoda of western and central Europe are partly fairly well known from systematic point of view. By contrast southeastern Europe has attracted little interest and e.g. the Greek fauna is met with in five papers only, all from the last four decades.

The first Pauropoda reported from Greece were the two Pauropodidae species *Allopaupopus danicus* (Hansen) and *productus* Silvestri which appeared in a paper by P. A. REMY from 1935 (Bull. Soc. Hist. nat. Moselle 34: 288). They had been collected

by Remy himself from the vicinity of Athens, in all 11 specimens. A year later he listed (Archs Zool. exp. gén. 78: 15-31) 8 species from the same family: the two mentioned and *A. furcula* Silvestri, *aristatus* Remy, *cornutus* Remy, *doryphorus* Remy, *gracilis* (Hansen) and *Polypauropus duboscqi* Remy. They were in a collection of 32 specimens also brought together by Remy himself from one locality in Macedonia and one in Thessaly.

Later he also studied material collected by other zoologists. In 1955 Henri Coiffait and Pierre Strinati had found a specimen of a ninth Pauropodidae species, *Pauropus*



FIG. 1.

Greece. — 1. Ionian Islands; 2. Peloponnese; 3. Central Greece; 4. Attica and Euboea; 5. Epirus and Pindos; 6. Thessaly; 7. Western Macedonia; 8. Eastern Macedonia and Thracia; 9. Aegean Islands; 10. Southern Island Arc. (From STRASSER 1974.)

*furcifer* Silvestri, from Thracia, which REMY mentioned in a paper from 1961 (Bull. Soc. Lorraine Sci. 1: 87) and in 1959 Coiffait found 37 specimens of several species, including two of Eurypauropodidae, in flotation samples from Corfu and Peloponnesus. This material was also described in 1961 (Annls Spéleol. 16: 175-178) and REMY enumerated from it 9 species, 4 of which were new to Greece viz. two from Pauropodidae, *A. brevisetus* Silvestri and *cuenoti* (Remy), and two from Eurypauropodidae, *Trachypauropus glomerioides* Tömösváry and *Gravieripus atticus* Remy, the latter also new to science. Further REMY announced in the same paper the Pauropodidae genus *Hemipauropus* for the first time from Greece but his single specimen was defective and indeterminable.

Finally after having studied 13 specimens from Euboea collected in 1971 by Claude Delamare Deboutteville and Pierre Arpin and 87 specimens from Corfu, Peloponnesus, Euboea and Eurytania collected in 1967 by Paul Cassagnau the present author added (Biologia Gallo-Hellenica 5: 5-24) 9 more species from 3 families. Most of them belonged to Pauropodidae: *A. gravieri* Remy, *pectinatus* (Hansen) s.n. *fuscinifer* Remy (see p. 382-383), *helveticus* (Hansen), *sodalicus* Scheller (also new to science), *Rabaudauropus cuspidatus* (Remy), *Stylopaupus pedunculatus* (Lubbock) and *Scleropauropus heterochaetus* Remy. The families Brachypauropodidae and Eurypauropodidae had each one representant, *Brachypauropus hamiger* Latzel and *Trachypauropus eosus* Scheller respectively, the latter also new to science.

## 2. MATERIAL

Adding up the material from the collections mentioned above gives 23 species from 3 families. However, this is far from the definitive number which has also been shown by the Geneva soil zoology project led by Dr Bernd Hauser, curator of the Arthropoda section of the museum, which group has collected an extensive material from various parts of Greece. The bulk of it has been brought together by Dr Hauser himself but valuable contributions have also been made by Claude Besuchet, Ivan Löbl, Volker Mahnert and Pierre Strinati. Their material from 1971-1975 is accounted for below, in all 492 specimens which is almost 3 times as much as all earlier collections together. It was obtained by means of Berlese and Winkler funnel extractions from a large number of localities and biotopes. Twenty species were found of which 8 are new to Greece: *A. humilis*, ? *verecundus*, *corsicus*, *multiplex*, *P. huxleyi*, *H. hauseri*, *S. lyrifer* and *G. cordatus*. One of them is also new to science, *Hemipauropus* (*Multipauropus*) *hauseri* n. subgen. n. sp., which belongs to a new group within the genus with a tergal chaetotaxy strongly deviating from that in other species of the genus.

## 3. SYSTEMATICS OF GREEK PAUROPODA

### Key to families

1. First and last tergites covering at least head and anterior part of pygidium respectively; body flattened . . . . . *Eurypauropodidae*
- First and last tergites small leaving head and pygidium free; body subcylindrical 2
2. 6 undivided dorsal tergites . . . . . *Pauropodidae*
- 6 divided tergites or 9-10 tergites usually divided . . . . . *Brachypauropodidae*

## 3.1. Family PAUROPIDAE

*Key to subfamilies*

1. Sternal antennal branch with setae  $q$  and  $q'$ ; 2 antennal globuli joined to a single stalk; mediotergal plate of head present . . . . . *Polypauropodinae*
- Sternal antennal branch with  $q$ ; one antennal globulus; mediotergal plate of head absent . . . . . 2
2. Tergites thin . . . . . *Pauropodinae*
- Tergites sclerotized . . . . . *Scleropauropodinae*

## 3.1.1. Subfamily PAUROPIDAE

*Key to genera*

1. Preanal segment much narrower than the others, longer than broad . . . . . *Hempauropus* Silvestri
- Preanal segment only a little narrower than the others, broader than long . . . . . 2
2. Anterior margin of sternal antennal branch shorter than posterior margin . . . . . *Allopaupopus* Silvestri
- Anterior and posterior margins of sternal antennal branch of equal length. . . . . 3
3. Pygidial sternum with setae  $b_2$ ; stalk of antennal globulus shorter than diameter of globulus . . . . . *Pauropus* Lubbock
- Setae  $b_2$  on pygidial sternum absent; stalk of antennal globulus distinctly longer than diameter of globulus . . . . . 4
4. Seta  $q'$  on sternal antennal branch present . . . . . *Rabaudaupopus* Remy
- Seta  $q'$  on sternal antennal branch absent . . . . . *Stylopaupopus* Cook

3.1.1.1. Genus *Allopaupopus* Silvestri, 1902*Key to subgenera of Allopaupopus*

1. Setae  $b_3$  of pygidial sternum present . . . . . *Allopaupopus* s. str.
- Setae  $b_3$  of pygidial sternum absent . . . . . *Decapaupopus* Remy

3.1.1.1.1. Subgenus *Allopaupopus* s. str.*Key to species*

1. Anal plate with a posteromedian incision . . . . . 2
- Anal plate posteriorly straight or medioposteriorly produced into a triangular process . . . . . 3



2. Anal plate with 4 posterior processes; *st* leaf-shaped; axis of  $T_3$  thin. . . . . *brevisetus* Silvestri
- Anal plate with 2 posterior processes; *st* clavate; axis of basal half of  $T_3$  clavate . . . . . *furcula* Silvestri
3. Posterior margin of anal plate almost straight . . . . . 4
- Posterior margin of anal plate produced into a triangular process . . . . . 5
4. Anal plate broadest posteriorly, with two posterior appendages; *st* blunt . . . . . *danicus* (Hansen)
- Anal plate broadest anteriorly, appendages absent; *st* pointed . . . *gravieri* Remy
5. Anal plate broadest anteriorly; axis of  $T_3$  thick; pygidial  $a_1$  leaf-shaped, blunt . . . . . *humilis* Remy
- Anal plate broadest in the middle; axis of  $T_3$  thin; pygidial  $a_1$  short, cylindrical . . . . . *verecundus* Remy

1. *Allopauropus* (A.) *brevisetus* Silvestri, 1902 (Fig. 2)

In: BERLESE, A.: *Acari, Myriopoda et Scorpiones hucusque in Italia reperta*, 10, Fasc. 95, No. 12. Padua.

*Material examined.* 8 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, 15 km NW Kerkira (SCHELLER 1973: 5-6); Ipsos, near the Hotel Ipsos Beach, at the base of *Quercus* sp., soil sample,

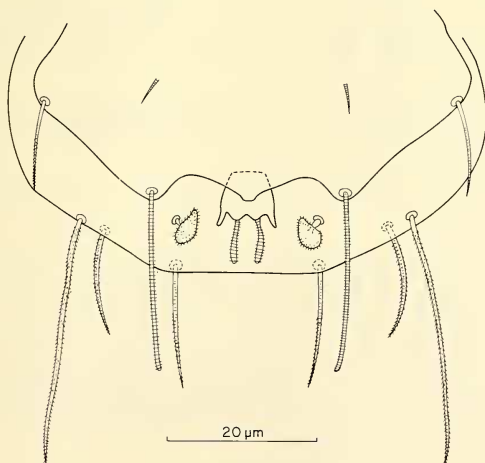


FIG. 2.

*Allopauropus* (A.) *brevisetus* Silvestri.  
Pygidium, ventral view.

Berlese extraction, 1 ad. 9<sup>1</sup> (♂), 1972-04-09, (Loc. Io-72/4, leg. Hauser); Ayoi Theodori 1 (REMY 1961 b: 176).

PELOPONNESUS. Between Andritsena and Bassae, near the road, alt. 1170 m, soil sample from under *Quercus coccifera*, Berlese extraction, 2 ad. 9 (♂, ♀), 3 juv. 6, 1975-04-20, (Loc. Hel-75/5, leg. Hauser). Between Bassae and Perivolia, near the road, alt. 980 m, soil sample from under *Quercus coccifera*, Berlese extraction, 1 ad. 9 (♀), 1975-04-20, (Loc. Hel-75/9, leg. Hauser).

EPIRUS. 2 km E Ag. Komassos, in a gorge, alt. 200 m, 1 ad. 9 (♀), 1973-04-25, (Loc. Ep-73/12, leg. Mahnert).

*General distribution.* EUROPE: France, Switzerland, Roumania, Italy, Yugoslavia, Bulgaria, Greece, ? Great Britain.

NORTH AMERICA: Florida.

## 2. *Allopauropus* (A.) *danicus* (Hansen, 1902) (Fig. 3)

*Vidensk. Meddr dansk naturh. Foren.*, 1901: 376-378, pl. III, fig. 4 a-f. Copenhagen.

*Material examined.* 281 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Zante, Mount Skopos, under cupresses, soil sample, Berlese extraction, 3 juv. 6, 1971-03-24, (Loc. Gr-71/16, leg. Hauser). Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 13 ad. 9 (4 ♂, 9 ♀), 1 subad. 8 (♀), 1 juv. 5, 1974-05-11, (Loc. Pel-74/17, leg. Hauser); Kaligoni, near the old spring, sieved litter from the base of steep rocks, alt. 50 m, Berlese extraction, 1 ad. 9 (♀), 1974-05-11, (Loc. Pel-74/18, leg. Hauser). Ithaca, near Exoghi, alt. 400 m, under *Cupressus*, soil sample, Berlese extraction, 1 ad. 9 (♀), 1972-04-19. (Loc. Io-72/57, leg. Hauser). Corfu, Gouvia (REMY 1961 b: 176); Ipsos, near the Hotel Ipsos Beach, under *Quercus*, soil sample, Berlese extraction, 1 ad. 9 (♀), 1972-04-09, (Loc. Io-72/4, leg. Hauser).

PELOPONNESUS. Near Diakopton, Trapeza, 1 subad. 8 (♀), 1974-04-13, (Leg. Strinati). Between Bassae and Perivolia, near the road, alt. 980 m, soil sample from under *Quercus coccifera*, Berlese extraction, 5 ad. 9 (3 ♂, 2 ♀♀), 1 subad. 8 (♀), 8 juv. 6, 1 juv. 5, 5 juv. 3, 1975-04-20, (Loc. Hel-75/9, leg. Hauser).

ATTICA and EUBOEA. Athens, Nea Philadelphieia (REMY 1935 c: 18). Euboea, Dirfis Massif (SCHELLER 1973: 6).

EPIRUS. N Kestirion, alt. 30 m, under bushes, soil sample, Berlese extraction, 137 ad. 9 (48 ♂, 84 ♀, 5 sex ?), 35 subad. 8 (2 ♂, 25 ♀, 8 sex ?), 11 juv. 6, 2 juv. 5, 1973-05-05, (Loc. Ep-73/92, leg. Hauser). 20 km NNE Neraida, Polidrosos, oak forest, alt. 530 m, soil sample, Berlese extraction, 40 ad. 9 (15 ♂, 24 ♀, 1 sex ?), 9 subad. 8 (3 ♂, 6 ♀), 1 juv. 6, 1973-05-04, (Loc. Ep-73/80, leg. Hauser). 2 km N Agnanta, *Picea* forest, alt. 800 m, soil sample, Berlese extraction, 1 juv. 6, 1973-05-02, (Loc. Ep-73/64 B, leg. Hauser). 11 km SE Konitsa, in gorge at the river Bogsomatis, under oaks and hazels, alt. 450 m, soil sample, Berlese extraction, 1 ad. 9 (♂), 1973-04-30, (Loc. Ep-73/47, leg. Hauser).

THESSALY. Kalabaka (REMY 1936 a: 15).

WESTERN MACEDONIA. Nision (REMY 1936 a: 15).

<sup>1</sup> Abbreviations: ad. ..., subad. ... and juv. ..., an adult, a subadult or a juvenile specimen with the number of pairs of legs indicated.

AEGEAN ISLANDS. Samos, near the top of Gournis, alt. c. 800 m, sieved soil sample from under *Pinus* sp., soil not calcareous, 1 subad. 8 (♀), 1975-04-25, (Loc. Hel-75/35, leg. Hauser); same place, near the parting of the road to Ampelos, pine forest, alt. 100 m, soil sample, Berlese extraction, 1 ad. 9 (♀), 1975-04-25, (Loc. Hel-75/36, leg. Hauser).

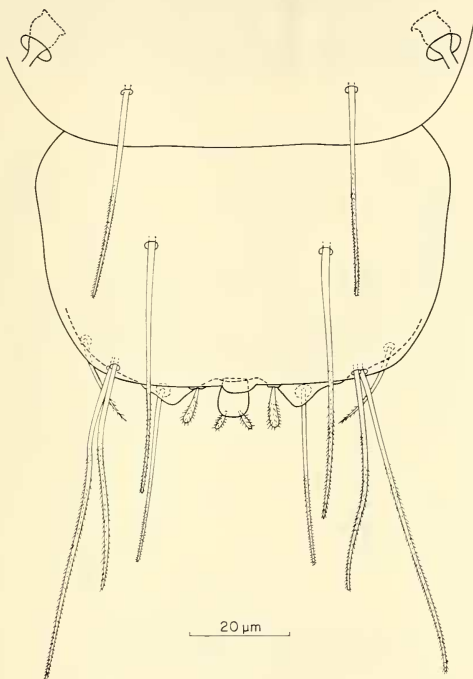


FIG. 3.

*Allopauropus* (*A.*) *danicus* (Hansen).  
Pygidium and posterior part of tergite VI, dorsal view.

*General distribution.* EUROPE: Many countries.

ASIA: Sri Lanka, Pondichéry.

AFRICA: Northern and tropical parts, Madagascar and the Mascarenes.

NORTH AMERICA: US.

SOUTH AMERICA: Chile.

*A. danicus* is (sub)cosmopolitan.

### 3. *Allopaupopus (A.) furcula* Silvestri, 1902 (Fig. 4)

In: BERLESE, A.: *Acari, Myriopoda et Scorpiones hucusque in Italia reperta*, 10, Fasc. 95, No. 7. Padua.

*Material examined.* 11 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, near Makradhes, alt. 380 m, soil sample, Berlese extraction, 8 ad. 9 (7 ♂, 1 sex ?), 2 subad. 8 (♀), 1972-04-10, (Loc. Io-72/14, leg. Hauser); 15 km NW Kerkira (SCHELLER 1973: 6).

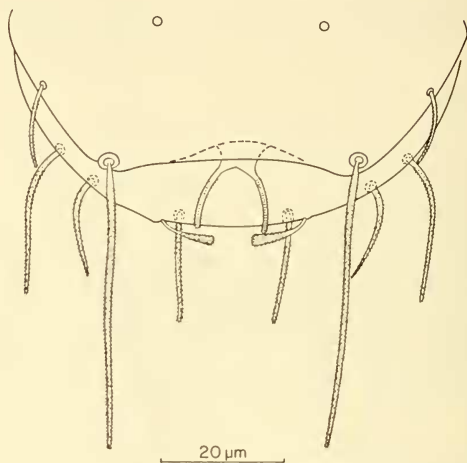


FIG. 4.

*Allopaupopus (A.) furcula* Silvestri.  
Pygidium, ventral view. Stea  $b_3$  not shown.

EPIRUS. N Kestrian, alt. 30 m, soil sample from under bushes, Berlese extraction, 1 subad. 8 (♀), 1973-05-05, (Loc. Ep-73/92, leg. Hauser).

WESTERN MACEDONIA. Nision (REMY 1936 a: 25).

*General distribution.* EUROPE: France, Italy, Yugoslavia, Roumania, Bulgaria, Greece.

*Taxonomical remarks.* The antennal globulus has about 10 bracts and its stalk is proportionately distinctly longer than described by Silvestri.

### 4. *Allopaupopus (A.) gravieri* Remy, 1935 (Fig. 5)

*Vogesie* 1: 7-8. Nancy.

*Bull. Mus. Hist. nat. Paris* 7: 214-215, fig. 3. Paris.

*Material examined.* 2 specimens.

*Distribution in Greece.* PELOPONNESUS. Near Diakopton, Trapeza, 2 juv. 6, 1974-04-13, (Leg. Strinati).

ATTICA and EUBOEIA. Euboea, Kéramou (SCHELLER 1973: 8).

*General distribution.* EUROPE: France, Italy, Roumania, Greece.

AFRICA: Algeria.

The species is rare but may be widespread in the southern part of the western Palearctic.

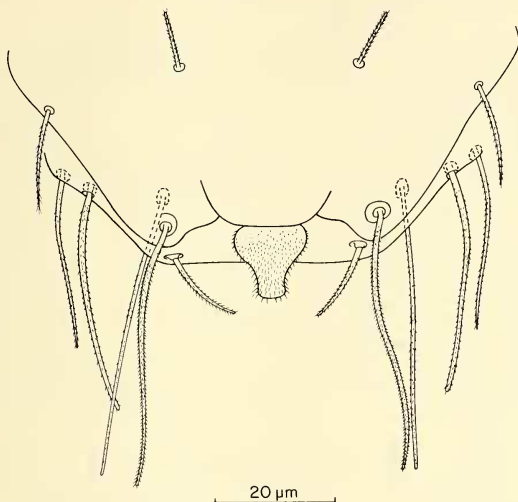


FIG. 5.

*Allopauropus (A.) gravieri* Remy, third instar larva.  
Pygidium, ventral view.

*Taxonomical remarks.* In the original diagnoses REMY (1935 *a* and *b*) erroneously provided the posterior end of the anal plate with two diverging horn-like appendages. Accordingly they were omitted in his emended description from 1938. However, there REMY also says (p. 164) that the plate seems to have two short appendages inserted on its sternal side but they were not shown in his drawing (p. 162, fig. 2). In the Greek specimens studied by the author no appendages have been found.

##### 5. *Allopauropus (A.) humilis* Remy, 1945 (Fig. 6)

*Archs Zool. exp. gén.* 84: 81-85, fig. 2. Paris.

*Material examined.* 3 specimens.

*Distribution in Greece.* EPIRUS. 20 km NNE Neraida, Polidrosion, oak forest, alt. 530 m, soil sample, Berlese extraction, 3 ad. 9 (1 ♂, 2 ♀), 1973-05-04, (Loc. Ep-73/80, leg. Hauser). — New to Greece.

*General distribution.* EUROPE: Bulgaria, Greece.

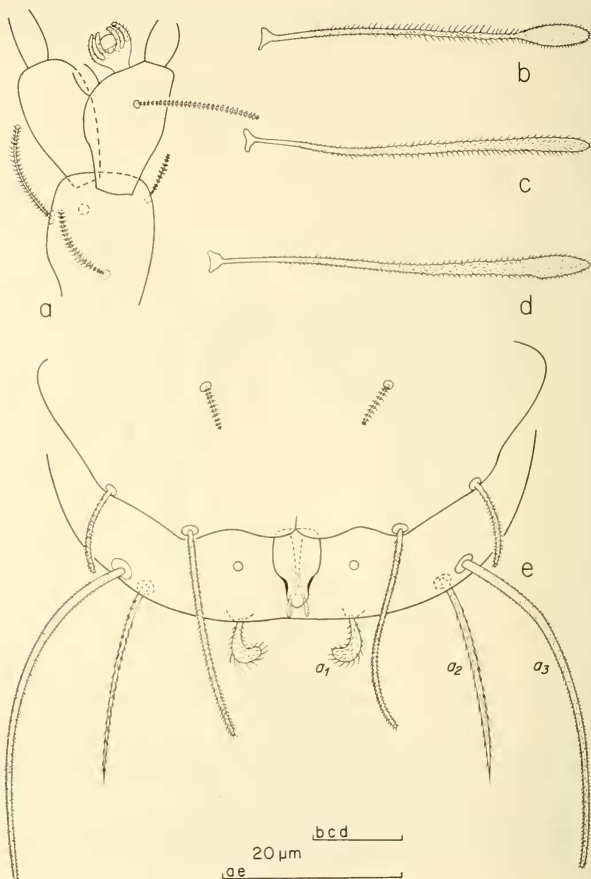


FIG. 6.

*Allopaupopus (A.) humilis* Remy.

a, left antenna, sternal view. b-d, variation in the shape of  $T_3$ . e, pygidium, ventral view.

The species was described by Remy on 15 Bulgarian specimens collected by Parashkewa Krestewa in the nineteen-thirties but has not been refound until Dr Hauser collected the above specimens. *A. humilis* seems to belong to a southeastern faunal element.

*Taxonomical remarks.* The Greek specimens deviate in a few respects from the type specimens as described by Remy.

*Head.* Each of the temporal organs has a subcuticular semiglobular or claviform pistil just posterior of the middle. REMY says (1945a: 81) that the tergal antennal branch is 2.5-3 times as long as wide but it is here proportionately shorter and wider, 1.8-1.9 times as long as wide. Accordingly the diameter of the globulus in relation to the greatest diameter of the tergal branch is lower, 0.4 not 0.5.

*Trunk.* Though the  $T_3$  were not represented in REMY's drawings their shape was penetratingly discussed in the original description. In the adult stage and the subadult with 8 pairs of legs they were thickest in the middle and from that point tapering in both directions. However, in the juvenile stage with 6 pairs of legs they were clavate and of about the same shape as in *Allopaupopus productus* Silvestri, *fagei* Remy and *meridianus* Remy. In these species they have a distinct ovoid swelling apically.

In the Greek specimens the shape of the  $T_3$  varies: in one specimen they thicken gradually from the thin base, in the second they also thicken distally but have on the left side a less and on the right side a more distinct apical clavate enlargement and in the third specimen there are distinct apical ovoid swellings about 3 times longer than wide. These setae have all a short but distinct pubescence consisting of simple oblique hairs. On the distal swellings the pubescence was shorter than more proximally.

*Pygidium.* The seta  $a_1$  of the pygidial tergum was described by REMY (op. c.: 82) as slightly clavate and annulate but is here strongly clavate and pubescent. The distal half is thick and bent inwards like a hook. The  $a_2$  was 3.0-3.5 times as long as the  $a_1$  in Remy's specimens but this ratio is here 4.8-5.5. REMY also said that the  $a_3$  was c. 5 times longer than the  $a_1$  but here the ratio is 7.6-8.9.

## 6. *Allopaupopus* (A.) ?*verecundus* Remy, 1954 (Fig. 7)

*Bull. Soc. ent. Fr.* 59: 143-144, fig. 2. Paris.

*Material examined.* 3 specimens.

*Distribution in Greece.* SOUTHERN ISLAND ARC. Rhodes, northwestern part, Petaloudes, in maple forest, sieved litter and humus with underlying roots, Berlese extraction, 3 juv. 6, 1973-04-26, (Loc. Rh-73/8, leg. Besuchet). — New to Greece.

*General distribution* (true of *A. verecundus* s. str.). EUROPE: France.

The species was described by Remy on 2 juv. 6 specimens from Ariège in southern France but has not been refound anywhere. The type specimens seem to be lost. They are not in the Remy collection in Paris (Prof. J.-M. Demange in litt. 1975-04-24).

*Taxonomical remarks.* The specimens studied here belong to *A. verecundus* or a very near relative to it. Though being of the same stage as the specimens which Remy had available when describing *verecundus* their placing is doubtful. This because Remy's diagnose is incomplete and because some characters do not fit exactly in the diagnose. The differences and some characters not mentioned by Remy are listed below.

*Head.* Tergal setae short, slightly clavate, annulate. Relative length of setae, first row:  $a_1 = a_2 = 10$ ; 2nd row:  $a_1 = ?$ ,  $a_2 = 15$ ,  $a_3 = 12$ ; 3rd row:  $a_1 = 8$ ,  $a_2 = 12$ ;



4th row:  $a_1 = 13$ ,  $a_2 = 15$ . In first row  $a_1$  are 0.8 of distance  $a_1 - a_1$ , in 3rd and 4th rows this ratio is 0.7. Temporal organs about as long as their shortest distance apart. Each of them has in posterior half a subcuticular claviform pistil the length of which is about 0.2 of length of temporal organ; cylindrical stalk of pistil about as long as the distal widened part.

Antennae. Fourth joint with 4 setae, relative length of them:  $p = 100$ ,  $p' = 50$ ,  $p'' = 37$ ,  $r = 41$ . Tergal seta  $p$  1.3 times as long as tergal branch  $t$ . The latter clavate, 1.8 times as long as wide and as long as sternal branch  $s$  (in Remy's specimens  $t$  seems

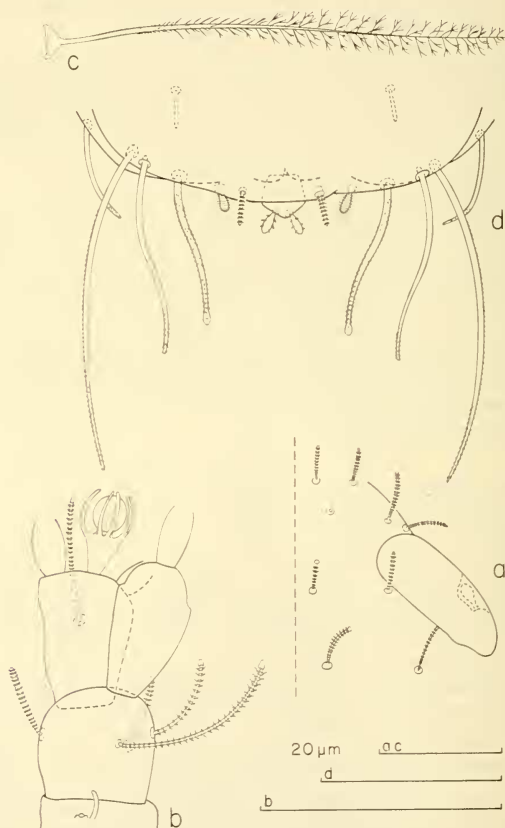


FIG. 7.

*Allopauropus (A.) ? verecundus* Remy, third instar larva.

*a*, head, right side, dorsal view. *b*, left antenna, dorsal view. *c*,  $T_3$ . *d*, pygidium, tergal view.

to be shorter than  $s$ ). Sternal branch clavate, 1.5 times as long as wide; its anterodistal corner is truncate; the seta  $g$  almost as long as length of the branch. Setae of 4th joint and sternal branch cylindrical, blunt, annulate. Relative length of flagella:  $F_1 = 100$ ,  $F_2 = 44$ ,  $F_3 = 85$ . Basal segment of  $F_2$  about half of the length of those of  $F_1$  and  $F_3$ . The  $F_1$  4.5 times as long as  $t$ ,  $F_2$  about twice and  $F_3$  about 4 times longer than  $s$ . Globulus 1.5 times as long as its greatest diameter (more short-stalked in Remy's specimens); diameter almost 0.8 of greatest diameter of  $t$ .

Trunk. Tactile setae  $T_1$ ,  $T_2$  and  $T_3$  similar. The  $T_3$  with the basal portion with a short simple pubescence increasing in length outwards, distal portion with long, delicate, ramose pubescence.

Pygidium. Tergum. Posterior margin with a low median lobe. Relative length of setae:  $a_1 = 100$ ,  $a_2 = 550$ ,  $a_3 = 920$ ,  $st = 75$ . The  $a_1$  are straight, cylindrical, blunt, annulate, slightly diverging (in Remy's specimens more slender and curved inwards);  $a_2$  and  $a_3$  almost as in Remy's specimens but proportionately shorter. Distance  $a_1$ - $a_1$  2.2 (in Remy's specimens 1.5) times as long as  $a_1$ ; distance  $st$ - $st$  5.0 (in Remy's specimens 5.8) times as long as  $st$  and greater than (slightly shorter than in Remy's specimens) distance  $a_1$ - $a_1$ .

Sternum. Relative length of setae ( $a_1 = 100$ ):  $b_1 = 624$ -630,  $b_2 = 310$ -317,  $b_3 = c$ . 100-122. The  $b_1$  tapering, pubescent;  $b_2$  tapering, pubescent distally,  $b_3$  cylindrical, blunt, pubescent. Length of  $b_1$  about as long as distance between them,  $b_2$  a little longer than distance,  $b_1$ - $b_2$ ,  $b_3$  0.2 of distance  $b_3$ - $b_3$  (the latter ratio 0.3-0.4 in Remy's specimens). Anal plate linguiform, pentagonal; it has two short, clavate, diverging appendages projecting backwards from sternal side near the posterior corners; appendages annulate, plate seems to be glabrous (anal plate in Remy's specimens more longish and without posterolateral corners).

### 3.1.1.1.2. Subgenus *Decapauropus* Remy, 1957

#### *Key to species*

1. Posteromedian part of anal plate protruding . . . . . 2
- Posteromedian part of anal plate with an incision . . . . . 3
2. Pygidial  $a_1$  very short, clavate;  $T_5$  with short pubescence . . . *productus* Silvestri
- Pygidial  $a_1$  long, thin, tapering;  $T_5$  with long spinous pubescence hairs . . .  
. . . . . *aristatus* Remy
3. Pygidial  $a_1$  and posterior setae on tergite VI very short . . . . . *doryphorus* Remy
- Pygidial  $a_1$  and posterior setae on tergite VI of normal length . . . . . 4
4. Tergite I with 2+2 setae . . . . . *sodalicus* Scheller .
- Tergite I with 4+4 setae . . . . . 5
5. Anal plate with 6 posterodistal appendages . . . . . 6
- Anal plate with 2 or 4 posterodistal appendages . . . . . 7
6. Anal plate strongly pubescent; lateral appendages directed outwards-backwards . . . . . *cuenoti* (Remy)
- Anal plate glabrous; lateral appendages directed backwards . . *pectinatus* (Hansen)

7. Anal plate with 2 posterodistal diverging appendages . . . . . *cornutus* Remy  
 — Anal plate of other shape . . . . . 8
8. Anal plate with long posterodistal appendages always projecting outside margin of plate . . . . . 9  
 — Anal plate with very short distal appendages most often not projecting outside margin of plate . . . . . 10
9. Anal plate about as broad as long, broadest in the middle; length of proximal seta on tarsus of 9th leg 0.2 of length of tarsus . . . . . *gracilis* (Hansen)  
 — Anal plate much longer than broad, narrowest in the middle; length of proximal seta on tarsus of 9th leg 0.4 of length of tarsus . . . . . *corsicus* Remy
10. Anal plate very small, spatulate; pygidial setae  $a_2$  almost as long as  $a_1$  . . . . . *multiplex* Remy  
 — Anal plate large, linguiform; pygidial setae  $a_2$  distinctly shorter than  $a_1$  . . . . . *helveticus* (Hansen) .

7. *Allopaupropus* (D.) *aristatus* Remy, 1936 (Fig. 8)

*Archs Zool. exp. gén.* 78: 19-22, figs. 6-9. Paris.

*Material examined.* 1 specimen.

*Distribution in Greece.* IONIAN ISLANDS. Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 1 ad. 9 (♀), 1974-05-11, (Loc. Pel-74/17, leg. Hauser).

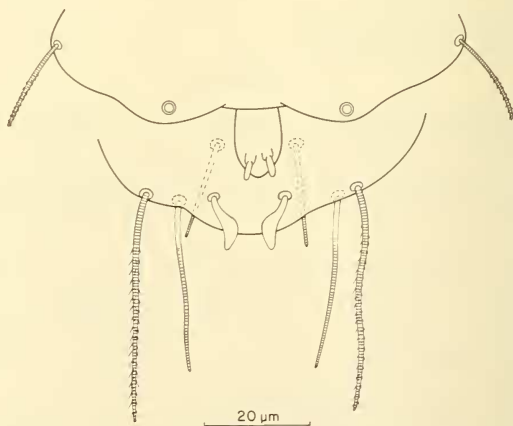


FIG. 8.

*Allopaupropus* (D.) *aristatus* Remy.

Pygidium, ventral view. Setae  $b_1$  not shown.

THESSALY. Kalabaka (REMY 1936a: 20).

*General distribution.* EUROPE: France, Spain, Yugoslavia, Bulgaria, Greece.

AFRICA: Madeira, Morocco, Algeria, Gambia, Madagascar.

NORTH AMERICA: US, Jamaica.

8. *Allopaupopus* (D.) *cornutus* Remy, 1936 (Fig. 9)

*Archs Zool. exp. gén.* 78: 26-27, figs. 13-15. Paris.

*Distribution in Greece.* THESSALY. Kalabaka (REMY l.c.)

*General distribution.* EUROPE: France, Greece.

The species is exceedingly rare: one specimen from the Greek locus typicus and another one from Corsica.

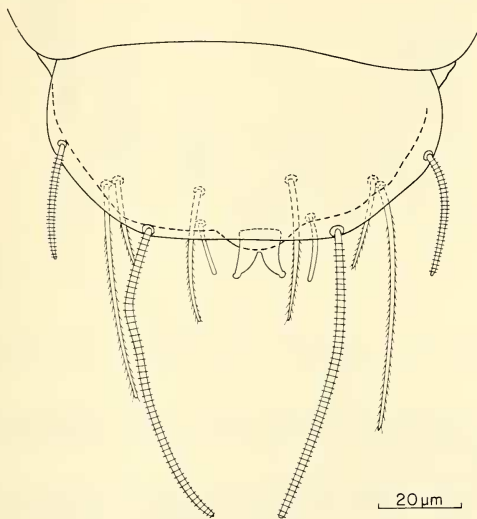


FIG. 9.

*Allopaupopus* (D.) *cornutus* Remy.  
Pygidium, ventral view. (After REMY 1936a: 27, fig. 17.)

9. *Allopaupopus* (D.) *corsicus* Remy, 1940 (Fig. 10)

*Bull. Soc. zool. Fr.* 65: 48-50, figs. 2-4. Paris.

*Material examined.* 1 specimen.

*Distribution in Greece.* EPIRUS. 20 km NNE Neraida, Polidrosos, oak forest, alt. 530 m, soil sample, Berlese extraction, 1 ad. ♀, 1973-05-04, (Loc. Ep-73/80, leg. Hauser). — New to Greece.

*General distribution.* EUROPE: France, Bulgaria, Greece.

AFRICA: Algeria.

*Taxonomical remarks.* The specimens reported by REMY (1945*b*, 1947*a* and *b*, 1952, 1961*a*) from France and Algeria, by LECLERC (1953) from France and by KRESTEWA (1940 s.n. *A. vulgaris*) from Bulgaria seem all to have agreed with the type material. The Greek specimens may permit the following remarks.

*Head.* The head was not described by Remy. Its setae are subcylindrical-slightly clavate, annulate. Length of temporal organs about as long as their shortest distance apart; subcuticular pistil lacking.

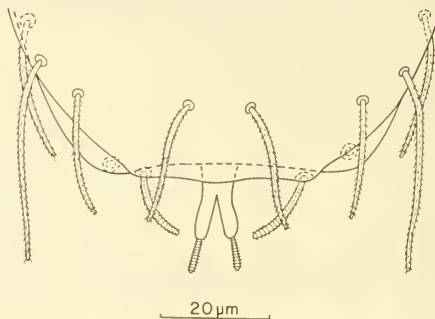


FIG. 10.

*Allopauropus (D.) corsicus* Remy.  
Pygidium, dorsal view. Setae  $b_1$  not shown. (After REMY 1940: 49, fig. 4.)

*Antennae.* Fourth joint with 5 setae:  $p$ ,  $p'$ ,  $p''$ ,  $r$  and  $u$ . They are all thin, cylindrical, densely annulate. Tergal branch 3.8 times as long as wide (not almost 3 times longer than wide as stated by REMY 1940: 48).

*Trunk.* The  $T_3$  are thinner than is shown in REMY's drawing (op. c.: 49, fig. 3).

*Pygidium.* The ratio  $b_1/b_1-b_1$  is 1.3 (REMY stated almost 1.6) and the  $b_1$  are 3 times longer than the  $a_1$  (REMY said 4 times). The distal lobes of the anal plate are less rounded and proportionately shorter than described by REMY.

#### 10. *Allopauropus (D.) cuenoti* (Remy, 1931) (Fig. 11)

*Archs Zool. exp. gén.* 71: 67-83, figs. 1-12. Paris.

*Material examined.* 21 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, Ayoi Theodori 1 (REMY 1961*b*: 176); 15 km NW Kerkira (SCHELLER 1973: 7).

PELOPONNESUS. E of Sparti, Tripi (REMY 1961*b*: 176).

ATTICA and EUBOEA. Between Yaltra and Kéramou (SCHELLER 1973: 7).

AEGEAN ISLANDS. Samos, near the top of Gournis, alt. c. 900 m, soil not calcareous, soil sample from under *Pinus* sp. and *Quercus coccifera*, Berlese extraction, 1 ad. 10 (♀), 1 ad. 9 (♂), 1 subad. 8 (♀), 1975-04-25, (Loc. Hel-75/35, leg. Hauser). Same place, near the entrance to the cave Tzitzir Tripa, alt. 500 m, soil sample from pine forest, Berlese extraction, 5 subad. 8 (1 ♂, 4 ♀), 9 juv. 6, 3 juv. 5, 1975-04-26, (Loc. Hel-75/41, leg. Hauser).

SOUTHERN ISLAND ARC. Rhodes, northwestern part, Petaloudes, in maple forest, sieved litter and humus with underlying roots, Berlese extraction, 1 subad. 8 (♂), 1973-04-26, (Loc. Rh-73/8, leg. Besuchet).

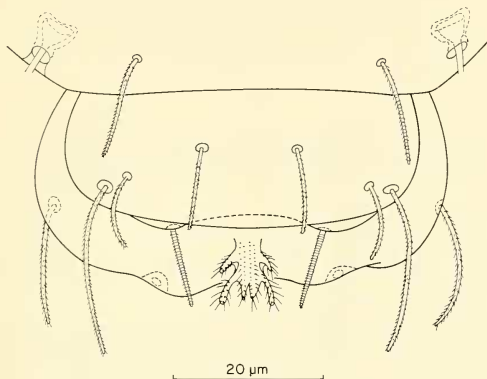


FIG. 11.

*Allopauropus* (D.) *cuenoti* (Remy).

Pygidium and posterior part of tergite VI. Setae  $b_1$  not shown.

*General distribution.* EUROPE: Finland, Denmark, Great Britain, Belgium, Luxembourg, West-Germany, East-Germany, France, Switzerland, Austria, Czechoslovakia, Roumania, Spain, Yugoslavia, Greece.

AFRICA: Madeira, Morocco, Algeria, Réunion.

NORTH AMERICA: US.

# 11. *Allopauropus* (D.) *doryphorus* Remy, 1936 (Fig. 12)

*Archs Zool. exp. gén.* 78: 17-19, figs. 4-5. Paris.

*Distribution in Greece.* THESSALY. Kalabaka (REMY l.c.).

*General distribution.* EUROPE: Greece.

AFRICA: Morocco, Algeria.

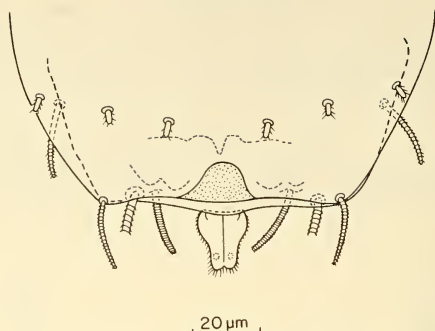


FIG. 12.

*Allopauropus (D.) doryphorus* Remy, fourth instar larva.

Pygidium, dorsal view. Setae  $b_1$  only partially shown. (After REMY 1936 a: 18, fig. 5.)

## 12. *Allopauropus (D.) gracilis* (Hansen, 1902) (Fig. 13)

*Vidensk. Meddr dansk naturh. Foren.* 1901: 395-397, pl. V, fig. 3 a-f. Copenhagen.

*Material examined.* 27 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, Ipsos, pastureground with olive-trees near the hotel Ipsos Beach, 1 subad. 8 (♀), 1972-04-09, (Loc. Io-72/9, leg. Mahnert); near Makradhes, alt. 380 m, soil sample, Berlese extraction, 4 ad. 9 (1 ♂, 3 ♀), 1 juv. 5, 1972-04-10, (Loc. Io-72/14, leg. Hauser). Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 3 ad. 9 (1 ♂, 2 ♀), 3 subad. 8 (♀), 1974-05-11, (Loc. Pel-74/17, leg. Hauser).

PELOPONNESUS. Between Andritsena and Bassae, near the road, alt. 1170 m, soil sample from under *Quercus coccifera*, Berlese extraction, 1 juv. 6, 1975-04-20, (Loc. Hel-75/5, leg. Hauser). Between Bassae and Perivolia, near the road, alt. 980 m, soil sample from under *Quercus coccifera*, Berlese extraction, 1 juv. 6, 1975-04-20, (Loc. Hel-75/9, leg. Hauser). Taigetos Massif, above Sparti, alt. 1090 m, north slope, *Abies cephalonica* forest, soil sample, Berlese extraction, 4 ad. 9 (2 ♂, 2 ♀), 2 juv. 6, 1974-05-08, (Loc. Pel-74/7, leg. Hauser).

CENTRAL GREECE. Near Karpenission, Timfristos pass (SCHELLER 1973: 8).

ATTICA and EUBOEIA. Attica, Limni Koumoundouru (REMY 1961b: 176). Euboea, Lichas Peninsula, Krokidia and at the base of Dirphys Massif (SCHELLER 1973: 8).

EPIRUS. Near Kopani, alt. 460 m, 1 ad. 9 (♀), 1973-05-03, (Loc. Ep-73/73, leg. Hauser).

THESSALY. Kalabaka (REMY 1936a: 22).

WESTERN MACEDONIA. Nision (REMY 1936a: 23, s.n. *Allopauropus sequanus* Remy).

AEGEAN ISLANDS. Icaria, at the road to Oxea, alt. 490 m, sifting of litter under *Arbutus* sp., Winkler extraction, 1 juv. 6, 1975-04-23, (Loc. Hel-75/24, leg. Hauser). Samos, near the top of Gournis, alt. c. 900 m, soil not calcareous, soil sample from



under *Pinus* sp. and *Quercus coccifera*, Berlese extraction, 2 juv. 6, 1975-04-25, (Loc. Hel-75/35, leg. Hauser). Same place, near the entrance to the cave Tzitzir Tripa, alt. 500 m, soil sample from pine forest, Berlese extraction, 3 subad. 8 (2 ♀, 1 sex ?), 1975-04-26, (Loc. Hel-75/41, leg. Hauser).

The species seems to have a wide distribution in Greece.

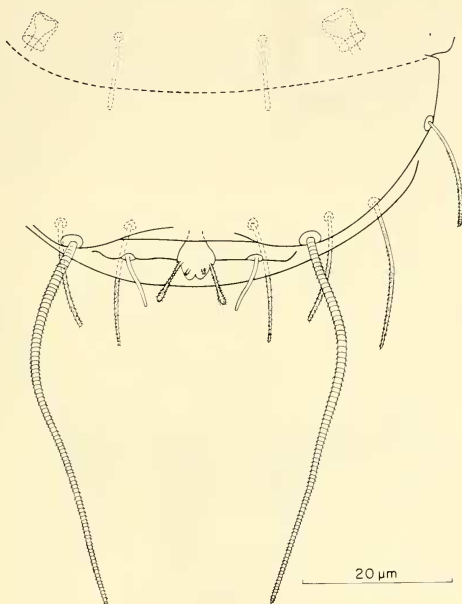


FIG. 13.

*Allopauropus* (*D.*) *gracilis* (Hansen).

Pygidium and posterior part of tergite VI, ventral view.

*General distribution.* EUROPE: Finland, Denmark, Ireland, Great Britain, Belgium, West-Germany, East-Germany, Poland, France, Switzerland, Austria, Czechoslovakia, Roumania, Spain, Italy, Yugoslavia, Bulgaria, Greece.

ASIA: Sri Lanka.

AFRICA: Madeira, Morocco, Algeria, Réunion.

NORTH AMERICA: US.

SOUTH AMERICA: Chile.

The species seems to have a (sub)cosmopolitan distribution.

*Taxonomical remarks.* Many varieties have been described, three of which are in Greece: *f. typica*, *amaudruti* and *sequanus*. The last mentioned is most common but intermediate forms between *amaudruti* and *sequanus* are also frequent.

13. *Allopauropus (D.) helveticus* (Hansen, 1902) (Fig. 14)

*Vidensk. Meddr dansk naturh. Foren.* 1901: 390-392, pl. IV, fig. 5 a-e. Copenhagen.

*Material examined.* 8 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 3 ad. 9 (♀), 1 subad. 8 (♀), 1974-05-11, (Loc. Pel-74/17, leg. Hauser).

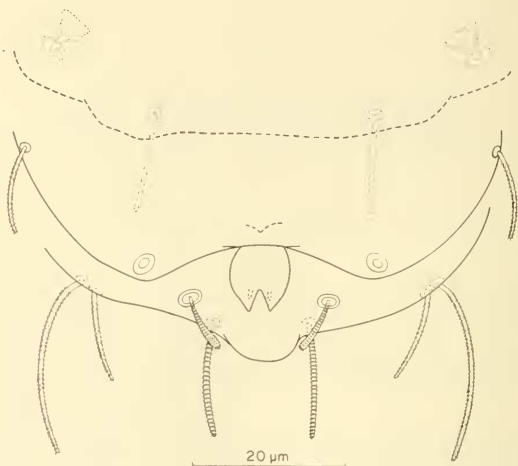


FIG. 14.

*Allopauropus (D.) helveticus* (Hansen).

Pygidium and posterior part of tergite VI, ventral view.

PELOPONNESUS. Between Bassae and Perivolia, near the road, alt. 980 m, soil sample from under *Quercus coccifera*, Berlese extraction, 1 subad. 8 (♀), 1 juv. 5, 1975-04-20, (Loc. Hel-75/9, leg. Hauser).

ATTICA and EUBOEAE. Euboea, Kéramou and at the base of Dirphys Massif (SCHELLER 1973: 9).

EPIRUS. 20 km NNE Neraida, Polidrosion, alt. 530 m, oak forest, soil sample, Berlese extraction, 2 ad. 9 (♀), 1973-05-04, (Loc. Ep-73/80, leg. Hauser).

*General distribution.* EUROPE: Denmark, Belgium, West-Germany, France, Switzerland, Austria, Czechoslovakia, Roumania, Spain, Italy, Yugoslavia, Greece.

AFRICA: Azores, Morocco, Algeria.

NORTH AMERICA: US.

The species is Holarctic and divided into two varieties with partly different ranges: f. *typica* which is known from Europe only and *obtusicornis* which is also in North Africa and North America. Both varieties are in Greece.

14. *Allopaupopus* (D.) *multiplex* Remy, 1936 (Fig. 15)

*Zool. Anz.* 116: 315-316, fig. 3. Leipzig.

*Material examined.* 3 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 1 ad. 9 (♀), 1 subad. 8 (♀), 1 juv. 6, 1974-05-11, (Loc. Pel-74/17, leg. Hauser). — New to Greece.

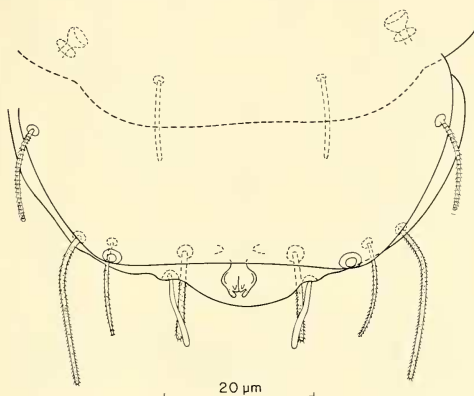


FIG. 15.

*Allopaupopus* (D.) *multiplex* Remy.

Pygidium and posterior part of tergite VI, ventral view.

*General distribution.* EUROPE: Sweden, Denmark, Great Britain, Belgium, West-Germany, East-Germany, France, Switzerland, Austria, Czechoslovakia, Andorra.

AFRICA: Morocco.

The species is known from the western Palearctic Region only and is most often not very frequent. It seems to be a rare species in Greece.

15. *Allopaupopus* (D.) *pectinatus* (Hansen, 1902) (Fig. 16)

*Vidensk. Meddr dansk naturh. Foren.* 1901: 388-390, pl. IV, fig. 4 a-d. Copenhagen.

*Material examined.* 2 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 1 ad. ♀, 1974-05-11, (Loc. Pel-74/17, leg. Hauser).

ATTICA and EUBOEIA. Kéramou (SCHELLER 1973: 7-8 s.n. *Allopaupopus fuscinifer* Remy).

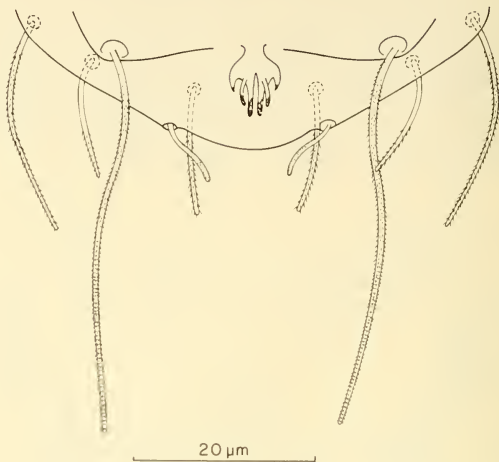


FIG. 16.

*Allopaupopus (D.) pectinatus* (Hansen).

Pygidium, ventral view. Setae  $b_2$  not shown. The adult female from Cephalonia, Poros (Loc. Pel-74/17).

EPIRUS. 20 km NNE Neraida, Polidrosos, alt. 530 m, oak forest, soil sample, Berlese extraction, 1 ad. ♀, 1973-05-04, (Loc. Ep-73/80, leg. Hauser).

*General distribution.* EUROPE: Czechoslovakia (CHALUPSKY in lett. 1975-10-14), France, Spain, Italy, Yugoslavia, Greece.

AFRICA: Morocco, Algeria.

*Taxonomical remarks.* Some difficulties have long surrounded the possibility to fix the taxonomical limits of *A. pectinatus* with certainty. Limitations in Hansen's description combined with the rarity of the species long made correct identifications impossible. The species was overlooked until REMY (1942: 24-25) redescribed the anal plate and emended Hansen's picture of it but also afterwards because Remy's drawings were incomplete.

The Greek specimens from the Ionian Islands and Epirus have been compared with Hansen's type specimen from Italy and, though the latter now is defective, striking resemblances could be proved. A fresh study of the measuring of a pauropod from Euboea which earlier was referred by me to *A. fuscinifer* (SCHELLER 1973: 7-8) has shown

that it too belongs to *pectinatus*. In all these specimens the anal plate agrees well also with the characters added to it by REMY (l.c.).

16. *Allopaupopus* (D.) *productus* Silvestri, 1902 (Fig. 17)

In BERLESE, A.: *Acari, Myriopoda et Scorpiones hucusque in Italia reperta*, 10, Fasc. 95, No. 9. Padua.

*Material examined.* 11 specimens.

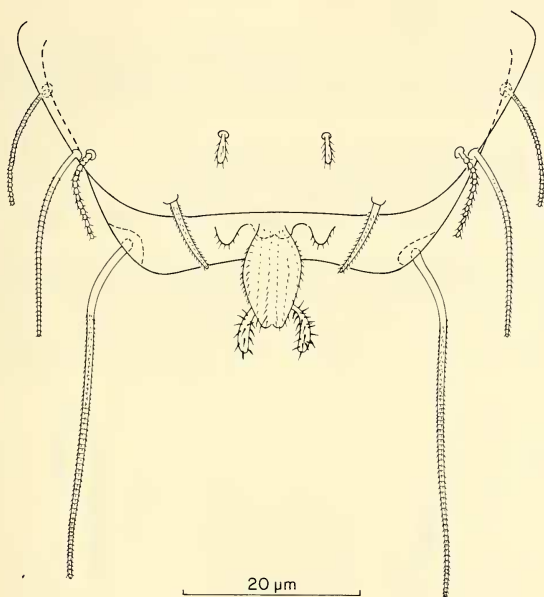


FIG. 17.

*Allopaupopus* (D.) *productus* Silvestri.  
Pygidium, dorsal view.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, Paléokastritsa and Doukades (REMY 1961b: 176). Ithaca, near Exoghi, alt. 400 m, under *Cupressus*, soil sample, Berlese extraction, 1 ad. 9 (♀), 1 subad. 8 (♀), 1 juv. 5, 1972-04-19, (Loc. Io-72/57, leg. Hauser); soil sample, Berlese extraction, from near the preceding locality, 3 subad. 8 (1 ♂, 1 ♀, 1 sex ?), 3 juv. 6, 1 juv. 5, 1972-04-19, (Loc. Io-72/58, leg. Hauser).

ATTICA and EUBOEIA. Attica: Athens, Nea Philadelphia and Old Phaleron (REMY 1935c: 18); Limni Koumoundouru, Raphina and Cape Souniun (REMY 1961b: 176).

Euboea: Lichas Peninsula, at Krokidia and between Yaltra and Kéramou and at Kéramou (SCHELLER 1973: 9).

EPIRUS. N Kestrian, alt. 30 m, under bushes, soil sample, Berlese extraction, 1 subad. 8 (♀), 1973-05-05, (Loc. Ep-73/92, leg. Hauser).

THESSALY. Kalabaka (REMY 1936a: 17).

The species seems to have a wide range in Greece.

*General distribution.* EUROPE: France, Spain, Italy, Yugoslavia, Greece.

ASIA: Iraq.

AFRICA: Morocco, Algeria.

NORTH AMERICA: US.

The main area is around the Mediterranean but the occurrence in Iraq and various parts of the US may indicate a Holarctic distribution. However, in Europe it is only in the southern part.

17. *Allopauropus* (D.) *sodalicus* Scheller, 1973 (Fig. 18)

*Biologia Gallo-Hellenica* 5: 10-13, fig. 1. Athens.

*Distribution in Greece.* ATTICA and EUBOEA. Euboea, Lichas Peninsula, Krokidia (SCHELLER l.c.).

*General distribution.* The species is not known outside the above locality.

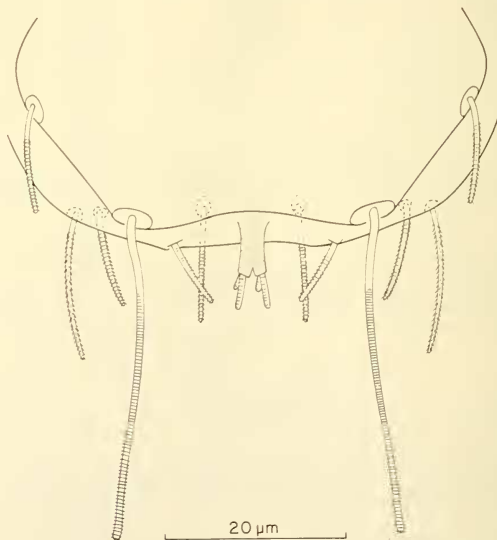


FIG. 18.

*Allopauropus* (D.) *sodalicus* Scheller.  
Pygidium, ventral view.

3.1.1.2. Genus *Pauropus* Lubbock, 1867*Key to species*

1. Submedian branches of anal plate with square ends, each with a short appendage . . . . . *furcifer* Silvestri
- Submedian branches of anal plate pointed, evenly tapering posteriorly, without appendages . . . . . *huxleyi* Lubbock

18. *Pauropus furcifer* Silvestri, 1902 (Fig. 19a)

In BERLESE, A.: *Acari, Myriopoda et Scorpiones hucusque in Italia reperta*, 10, Fasc. 95, No. 3. Padua.

*Material examined.* 8 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, Pantokrator Massif, between Perithia and Loutse, alt. 550 m, moss sample, Berlese extraction, 2 ad. 9 (♂, ♀), 1 subad. 8 (♀), 1972-04-09, (Loc. Io-72/8, leg. Hauser). Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 1 ad. 9 (♀), 1974-05-11, (Loc. Pel-74/17, leg. Hauser).

EPHROS. N Kestrian, alt. 30 m, under bushes, soil sample, Berlese extraction, 1 ad. 9 (♀), 1973-05-05, (Loc. Ep-73/92, leg. Hauser). Near Philiate, alt. 170 m, dry *Pinus* forest, sieved litter, Berlese extraction, 1 ad. 9 (♂), 1973-05-05, (Loc. Ep-73/93, leg. Löbl). 20 km NNE Neraida, Polidrosos, oak forest, alt. 530 m, soil sample, Berlese

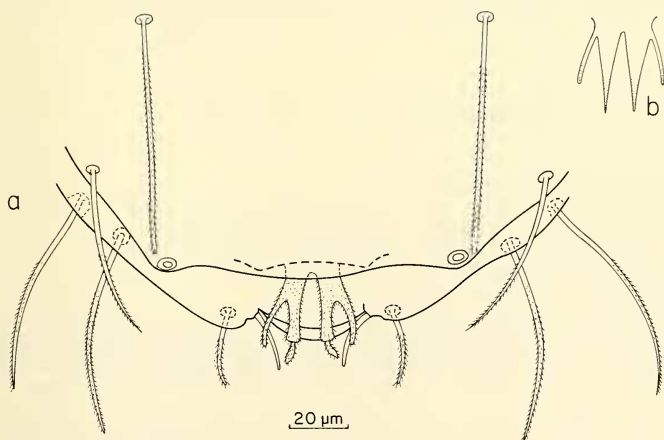


FIG. 19.

a, *Pauropus furcifer* Silvestri. Pygidium, ventral view. Setae  $b_1$  not shown.  
b, *Pauropus huxleyi* Lubbock, anal plate.



extraction, 1 ad. 9 (♀), 1973-05-04, (Loc. Ep-73/80, leg. Hauser). 2 km N Agnanta, alt. 800 m, 1 ad. 9 (♀), 1973-05-02, (Loc. Ep-73/68, leg. Mahnert).

EASTERN MACEDONIA and THRACIA. W Alexandroupolis, Makri (REMY 1961a: 87).

*P. furcifer* is a widespread species in western, central and southern Europe but in Greece it is so far reported from the northern parts.

*General distribution.* EUROPE: Great Britain, Belgium, West-Germany, France, Switzerland, Czechoslovakia, Roumania, Portugal, Andorra, Spain, Italy, Yugoslavia, Bulgaria, Greece.

AFRICA: Algeria.

AUSTRALIA: New Zealand.

This is probably a western Palearctic species. The new Zealand find may be doubtful (see REMY 1952b: 172).

### 19. *Paupopus huxleyi* Lubbock, 1867 (Fig. 19b)

*Trans. Linn. Soc. Lond.* 26: 182-185, pl. 10, figs. 1-19. London.

*Material examined.* 2 specimens.

*Distribution in Greece.* PELOPONNESUS. Between Andritsena and Bassae, near the road, alt. 1170 m, soil sample from under *Quercus coccifera*, Berlese extraction, 1 juv. 6, 1 juv. 5, 1975-04-20, (Loc. Hel-75/5, leg. Hauser).

*General distribution.* *P. huxleyi* may have a wide distribution but because it often has been confused with *P. lanceolatus* Remy it is now impossible to delimit its range.

*Remarks.* *P. lanceolatus* is often met with in Europe. It seems to have a large distributional area but so far it has not been found in Greece.

### 3.1.1.3. Genus *Stylopaupopus* Cook, 1896

#### 3.1.1.3.1. Subgenus *Stylopaupopus* s. str.

### 20. *Stylopaupopus* (S.) *pedunculatus* (Lubbock, 1867) (Fig. 20)

*Trans. Linn. Soc. Lond.* 26: 185, pl. 10, fig. 20. London.

*Material examined.* 14 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Ithaca, near Exoghi, alt. 400 m, under *Cupressus*, soil sample, Berlese extraction, 1 ad. 9 (♀), 1972-04-19, (Loc. Io-72/57, leg. Hauser); soil sample, Berlese extraction from near the preceding locality, 1 ad. 9 (♀), 1972-04-19, (Loc. Io-72/58, leg. Hauser); above Perahorion, *Quercus ilex* forest, 2 ad. 9 (♀), 1972-04-20, (Loc. Io-72/97, leg. Mahnert).

PELOPONNESUS. Between Olympia and Tripolis, Vitina Pass ((SCHELLER 1973: 15).

ATTICA and EUBOEAE. Euboea, Lichas Peninsula, Krokidia (SCHELLER 1973: 15).

EPIRUS. S Ioannina, alt. 570 m, *Pinus* sp. forest, 9 ad. 9 (5 ♂, 4 ♀), 1 subad. 8 (♂), 1973-04-29, (Loc. Ep-73/45, leg. Mahnert).

SOUTHERN ISLAND ARC. Rhodes, northwestern part, Petaloudes, in maple forest, sieved litter and humus with underlying roots, Berlese extraction, 1 subad. 8 (♀), 1973-04-26, (Loc. Rh-73/8, leg. Besuchet).

*S. pedunculatus* is not a frequent species in Greece but seems to be widely distributed there.

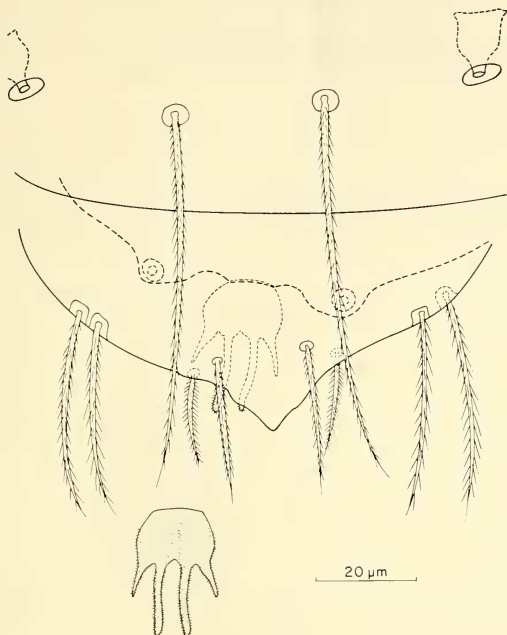


FIG. 20.

*Stylopauropus pedunculatus* (Lubbock).

Pygidium and posterior part of tergite VI, dorsal view, and (below) anal plate, ventral view.

*General distribution.* EUROPE: Denmark, Great Britain, Belgium, West-Germany, East-Germany, Poland, Soviet Union, France, Switzerland, Austria, Czechoslovakia, Roumania, Portugal, Spain, Italy, Yugoslavia, Bulgaria, Greece.

AFRICA: Tanger, Morocco, Algeria.

NORTH AMERICA: US.

AUSTRALIA: Victoria.

The species has a wide distribution in western Palearctic and northern Nearctic.

*Remarks.* Two subspecies have been described, *pedunculatus* Lubbock and *brevicornis* Remy. The former only has been found in Greece. Its anal plate shows a high variability

as to the length, thickness and direction of the posterior appendages. This has led to the description of three different forms, *danicus*, *italicus* and *carpathicus* (see CHALUPSKY 1964). The first two are in Greece.

3.1.1.4. Genus *Rabaudauropus* Remy, 1953

21. *Rabaudauropus cuspidatus* (Remy, 1939) (Fig. 21)

*Bull. Mus. r. Hist. nat. Belg.* 15: 12-15, figs. 4-5. Brussels.

*Material examined.* 1 specimen.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, 15 km NW Kerkira (SCHELLER 1973: 13).

EPIRUS. N Kestrian, alt. 30 m, under bushes, soil sample, Berlese extraction, 1 subad. 8 (♂), 1973-05-05, (Loc. Ep-73/92, leg. Hauser).

*General distribution.* EUROPE: Italy, Roumania, Yugoslavia, Greece.

AFRICA: Tanger.

The species is rare with 9 localities in all, 4 of them in Yugoslavia. The distribution of the localities indicates a Mediterranean range.

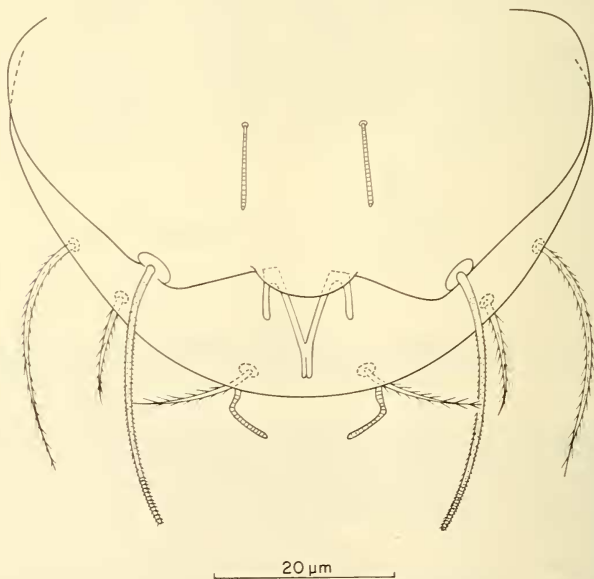


FIG. 21.

*Rabaudauropus cuspidatus* (Remy). Pygidium, ventral view.

3.1.1.5. Genus *Hemipauropus* Silvestri, 1902

In *H. hauseri* n.sp. which is described below the setae on the tergites I-V are very numerous and not arranged from a definitive pattern whereas in all other species of the genus the setae are few and always arranged into two simple transversal rows. Because the number and arrangement of tergal setae are stable characters in the Pauropoda it seems justifiable to create a new genus-group taxon for the new species, I propose, at the subgeneric level. So the genus *Hemipauropus* is here divided into two subgenera.

3.1.1.5.1. *Hemipauropus*, nominate subgenus

*Diagnose.* At most 12 setae on each of the tergites I-V in the adult stage; setae arranged into 2 simple, transversal rows on each tergite.

*Species:* *H. (H.) africanus* Remy

*angolanus* Remy

*difficilis* Remy

*dubius* Remy and Rollet

*gressitti* Remy

*jamaicensis* Remy

*leptoproctus* Silvestri

*obrei* Remy

*profugus* Remy

*reticulatus* Scheller

*richardi* Remy

*rosacostai* Remy

*tenuisetosus* Remy

*venetorum* Remy

*vuillaumei* Remy

*Type species:* The type species of the genus, *H. leptoproctus* Silvestri, 1902.

3.1.1.5.2. *Multipauropus* n. subgen.

*Diagnose.* Tergites I-V in the adult stage with numerous setae not arranged from a definitive pattern.

*Species:* *H. (M.) hauseri* n. sp.

22. *Hemipauropus* (M.) *hauseri* n. sp. (Figs. 22 and 23)

*Material examined.* 2 specimens.

*Stage ad.* 9

*Holotype.* The adult male from Epirus, Polidrosos, (Loc. Ep-73/80). Data: See below under Distribution. The type specimens are in the Museum of Natural History in Geneva.

Length. 0.63 mm.

*Head.* All the tergal setae spatulate except for lateral ones; the latter thin, cylindrical, blunt; lateral seta on the articulation capsule subcylindrical, pointed. All the setae with a dense and short pubescence, shortest on lateral setae. Relative length of setae, first row:  $a_1 = a_2 = 10$ ; 2nd row:  $a_1 = 12$ ,  $a_2 = ?$ ,  $a_3 = 16$ ; 3rd row:  $a_1 = 10$ ,

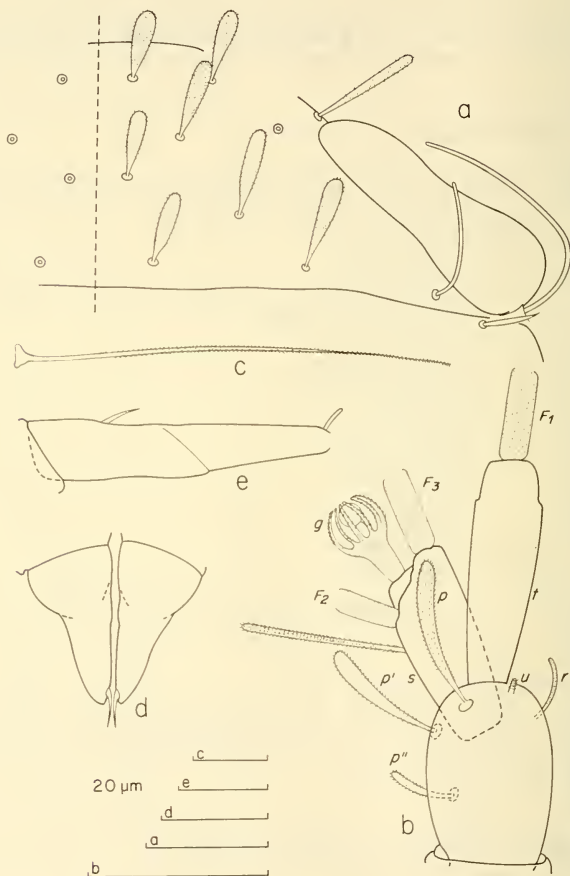


FIG. 22.

*Hemipauropus (Multipauropus) hauseri* n.sp., holotype.

a, head, right side, dorsal view. b, right antenna, dorsal view. c,  $T_3$ . d, penes. e, tarsus of 9th pair of legs. Pubescence only partially shown in b.

$a_2 = 12$ ; 4th row:  $a_1 = 11$ ,  $a_2 = 13$ . In first row the ratio  $a_1/a_1 - a_1$  is 1.0, in 2nd 0.5, in 3rd 1.2 and in 4th 0.6. Temporal organs widened posteriorly; no subcuticular pistil; length of temporal organs 0.6 of shortest distance between them.

*Antennae*. Fourth joint with 5 setae, relative length of them:  $p = 100$ ,  $p' = 88$ ,  $p'' = 47$ ,  $r = 41$ ,  $u = 16$ . The  $p$ ,  $p'$  and  $p''$  clavate and covered with a dense, short but distinct pubescence;  $r$  and  $u$  cylindrical, the former blunt and faintly pubescent, the latter pointed and with a few distinct pubescence hairs. Length of  $p$  almost 0.7 of length of tergal branch  $t$  which is subcylindrical, narrower at base than at apex; it is 3.2 times as long as wide and probably a little longer than sternal branch  $s$ . The latter branch, the anterodistal part of which is strongly truncate, between 2 and 2.5 times as long as wide; its seta  $q$  cylindrical, distinctly pubescent, blunt. Relative length of flagella (base segments included) and base segments:  $F_1 = 100$ , base segment = 15;  $F_2 = 51$ , base segment = 12,  $F_3 = c. 110$ , base segment = 15. The  $F_1$  is 2.6 times as long as  $t$ ,  $F_2$  and  $F_3$  approximately 1.5 and 3.5 times as long as  $s$  respectively. All the basal segments of the same shape, finely pubescent. Apical organs of  $F_1$  and  $F_3$  subequal, bulbiform, composed of probably 6-7 bracts. On  $F_2$  this organ is smaller, composed of a globule with two irregular cuticular swellings, a horizontal ring and a small apical cap.

*Trunk*. Tergites of very different size. Tergites I and VI narrowest, about 0.5 of the breadth of tergites III and IV which are broadest. The latter two are also longest. Tergite I 1.6 times as broad as long, in tergite II this ratio is 3.0, in tergite III 2.0, in IV 2.2, in V 1.8 and in VI 2.6. The last mentioned tergite very small, trapeziform. Cuticle of tergites smooth without reticular pattern.

Setae of tergites numerous, subequal, short, clavate, blunt; they are glabrous at low magnifications, coarse when studied with phase contrast at higher magnifications. On tergites I-V these setae are arranged in two transversal groups, an anterior one and a posterior one, the former always having fewer setae than the posterior one. Each group may consist of two transversal rows of setae but the setae are so irregularly inserted that the rows are indistinct or even impossible to separate. The doublerow is most marked on anterior part of tergite I and posterior part of tergite IV. Total number of setae on each tergite is 38 (18 anterior + 20 posterior) on tergite I, 69 (23 + 46) on II, 76 (31 + 45) on III, 63 (21 + 42) on IV, 37 (15 + 22) on V and 4 (2 + 2) on VI. A few anterolateral setae on tergites I-V are 1.1-1.7 times as long as inner setae. On tergites II-V the number of setae in the median part of the anterior group diminishes posteriorly. On tergite VI the anterior row has 2 setae which are placed on the anterolateral side of the insertion point of  $T_5$ . These setae are 1.6 times as long as postero-median setae which are between  $T_5$  anterior of the posterior border of the tergite. Length of the latter setae reach 0.2 of distance between them.

Last pair of tactile setae lacking. Relative length of the others:  $T_1 = 100$ ,  $T_2 = c. 100$ ,  $T_3 = 130$ ,  $T_4 = 109$ . All these setae have simple, thin, straight axes covered with a short dense pubescence. The  $T_1$ ,  $T_2$  and  $T_4$  with very thin axes and a very delicate pubescence.

Penes 1.8 times as long as their greatest diameter; distal setae one fourth of length of penes. Penes conical but with a constriction about one third from proximal end, distal two thirds narrow, tapering.

Setae on coxa and trochanter of 9th pair of legs not studied.

Tarsus of 9th pair of legs slender, 5.0 times as long as its greatest diameter. Proximal seta almost glabrous, short, pointed, 0.1 of length of tarsus, 1.3 times as long as distal seta. The latter is subcylindrical, blunt, glabrous, its length not even 0.1 of length of tarsus.

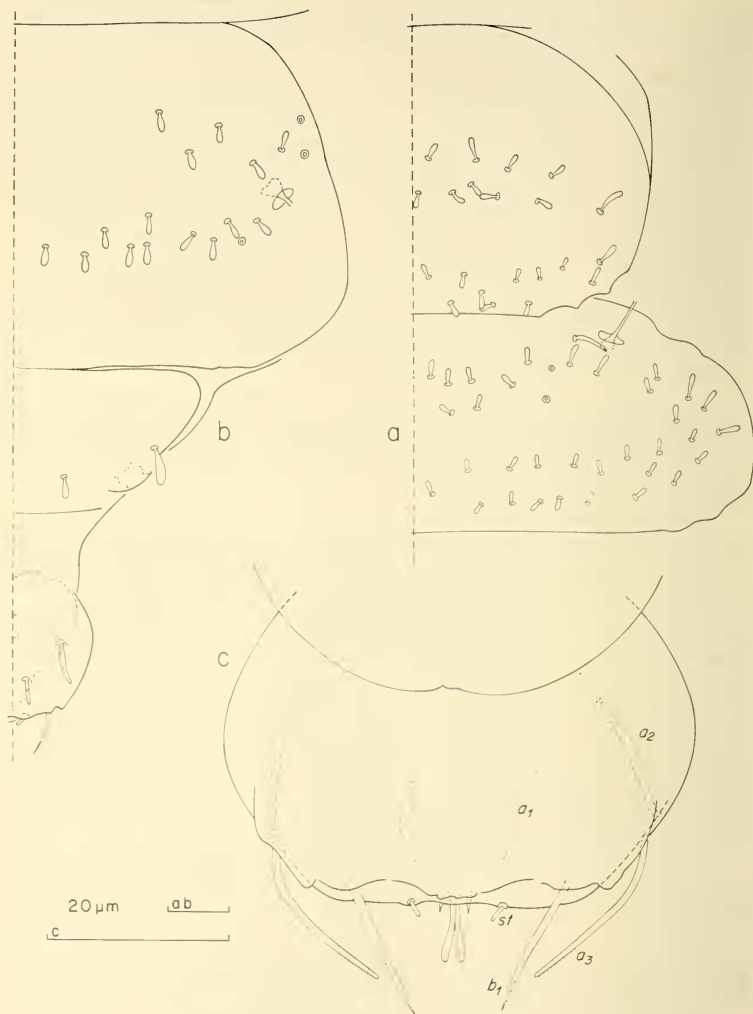


FIG. 23.

*Hemipauropus (Multipauropus) hauseri* n.sp., holotype.

*a*, tergites I and II, right side, dorsal view. *b*, tergite VI and pygidium, right side, dorsal view. *c*, pygidium, ventral view.



*Pygidium*. Greatest breadth of pygidium 0.4 of greatest breadth of tergite VI.

*Tergum*. Hind margin almost straight. Relative length of setae:  $a_1 = 100$ ,  $a_2 = 178$ ,  $a_3 = 234$  and  $st = 39$ . The  $a_1$  like a knife-blade with the edge turned laterally;  $a_2$  of the same general shape but more slender and distal part bent outwards;  $a_3$  sub-cylindrical, tapering, curved inwards and converging;  $st$  short, straight, cylindrical, blunt, converging. Distance  $a_1$ - $a_1$  1.1 times as long as  $a_1$ , distance  $a_1$ - $a_2$  a little longer than distance  $a_2$ - $a_3$ ; distance  $st$ - $st$  3 times longer than  $st$  and 1.1 times as long as distance  $a_1$ - $a_1$ .

*Sternum*. Median part of hind margin with a low but complicated bulge. Relative length of setae ( $a_1 = 100$ ):  $b_1 = 190$ . Neither  $b_2$  nor  $b_3$ . The  $b_1$  straight, tapering, pointed, converging. Length of  $b_1$  0.7 distance  $b_1$ - $b_1$ . Anal plate with a short and moderately broad base with two thin, straight, posterolateral spines and a much longer posteromedian forked appendage. The latter is 3 times longer than its greatest width and 2.8-3.0 times as long as the posterolateral spines.

*Stage juv.* 6

*Length.* 0.59 mm.

*Head*. Tergal setae shorter than in the adult stage. Relative length ( $a_1$  in ad. 9 = 10), first row:  $a_1 = 7.5$ ,  $a_2 = 9$ ; 2nd row:  $a_1 = 9$ ; 3rd row:  $a_1 = 10$ ,  $a_2 = 12$ ; 4th row:  $a_1 = 12$ . Ratio  $a_1/a_1$ - $a_1$  most often somewhat higher than in the adult, first row 1.1, 2nd row 0.4, 3rd row 1.3 and 4th row 0.8.

*Trunk*. Total number of setae on each tergite is 28 (13 anterior + 15 posterior) on tergite I, 37 (11 + 26) on II, 33 (13 + 20) on III, 15 (6 + 9) on IV and 4 (2 + 2) on VI.

*Pygidium*. Length, shape and arrangement of pygidial setae about as in the adult specimen.

*Distribution in Greece*. EPIRUS. 20 km NNE Neraida, Polidrosos, oak forest, alt. 530 m, soil sample, Berlese extraction, 1 ad. 9 (♂), 1973-05-04, (Loc. Ep-73/80, leg. Hauser). 1 km S Kato Kalentini, alt. 230 m, sieving, Winkler extraction, 1 juv. 6, 1973-05-02, (Loc. Ep-73/69, leg. Löbl).

REMY has earlier reported a *Hemipauropus* from Greece (1961b: 176) collected at Ayoi Theodori 1 on Corfu by H. Coiffait in 1959. Though it was adult Remy did not succeed in identifying the specimen because it had no antennae. Unfortunately, it may now be lost. It is not in the Remy collection in Paris (Prof. J.-M. DEMANGE in litt. 1975-04-24) and my search for it elsewhere has also been in vain.

However, Remy's *Hemipauropus* probably did not belong to the species described above. Remy was a skilful taxonomist and his hawkeyes should have discovered the peculiar chaetotaxy of the tergites if it had been there. If so had been the case it is unlikely to imagine that he should have omitted such an observation in the report of Coiffait's Pauropoda. The Greek fauna may have at least two species of *Hemipauropus*.

*Taxonomical remarks*. The occurrence of irregularly inserted setae on the tergites is a rare character in Pauropodidae and not earlier observed in the subfamily Pauropodinae. The single case from this large family is *Scleropauropus portitor* in the subfamily Scleropauropodinae which species was described in 1935 by Remy from southeastern France and later (1941: 370) separated by him from *Scleropauropus* proper and placed in a new subgenus *Hystrichopauropus*.

## 3.1.2. Subfamily SCLEROPAUPODINAE

3.1.2.1. Genus *Scleropauropus* Silvestri, 19023.1.2.1.1. Subgenus *Scleropauropus* s.str.*Key to species*

1. Tergite V with 6 + 4 setae; tergal head setae subcylindrical; styli claviform  
 . . . . . *heterochaetus* Remy
- Tergite V with 6 + 6 setae; tergal head setae lanceolate; styli cylindrical  
 . . . . . *lyrifer* Remy

23. *Scleropauropus* (S.) *heterochaetus* Remy, 1947 (Fig. 24)

*Soc. Sci. Nancy*, n. Sér. 6: 83-84. Nancy.

*Bull. Mus. Hist. nat.*, Sér. 2, 24: 80-83, figs. 1-4. Paris 1952.

*Distribution in Greece*. IONIAN ISLANDS. Corfu, 15 km NW Kerkira (SCHELLER 1973: 15-16).

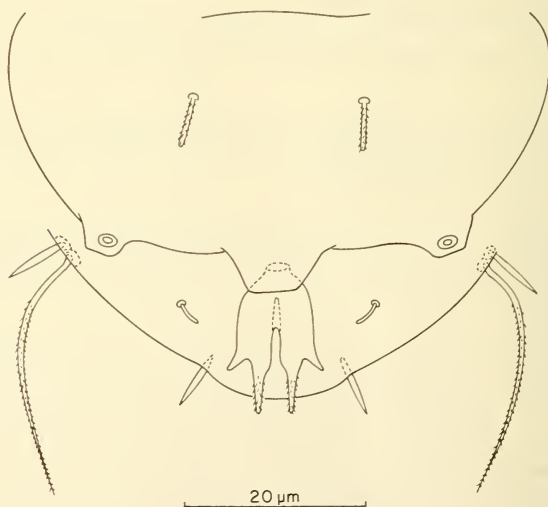


FIG. 24.

*Scleropauropus* (S.) *heterochaetus* Remy, fourth instar larva.  
 Pygidium, ventral view.

*General distribution.* EUROPE: Greece.

AFRICA: Morocco, Algeria.

The Greek find indicates that the species might have a Mediterranean distribution.

24. *Scleropauropus (S.) lyrifer* Remy, 1936 (Fig. 25)

*Zool. Anz.* 116: 316-317, fig. 4. Leipzig.

*Material examined.* 1 specimen.

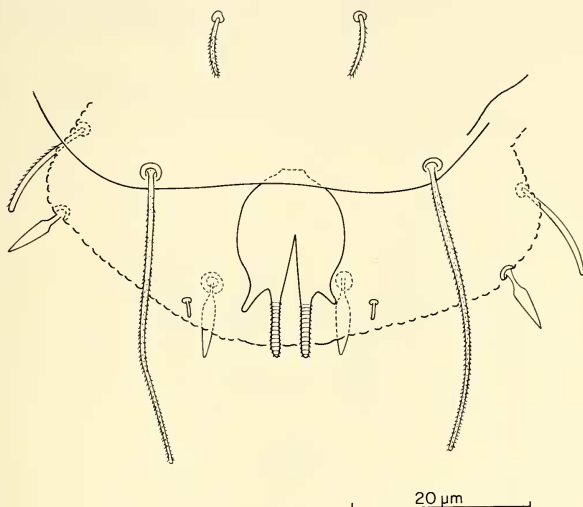


FIG. 25.

*Scleropauropus (S.) lyrifer* Remy.  
Pygidium, ventral view.

*Distribution in Greece.* IONIAN ISLANDS. Cephalonia, Poros, at the base of steep rocks above the village, alt. 280 m, Berlese extraction, 1 ad. 9 (♂), 1974-05-11, (Loc. Pel-74/17, leg. Hauser). — New to Greece.

*General distribution.* EUROPE: Belgium, West-Germany, France, Switzerland, Austria, Roumania, Yugoslavia, Greece.

AFRICA: Algeria.

NORTH AMERICA: US.

*Taxonomical remarks.* The Greek specimen agrees well with Remy's diagnosis of the species. It is distinguished only by a proportionately longer tergal branch of the antennae (3.8 times as long as wide instead of 3 times), by straight and proportionately long setae  $a_3$  on the pygidial tergum and by very pointed setae  $b_3$  on the pygidial sternum.

## 3.1.3. Subfamily POLYPAUROPODINAE

3.1.3.1. Genus *Polypauropus* Remy, 193225. *Polypauropus duboscqi* Remy, 1932 (Fig. 26)

*Archs Zool. exp. gén.* 74: 287-303, figs. 1-8. Paris.

*Distribution in Greece.* PELOPONNESUS. E of Sparti, Tripi (REMY 1961b: 176).

THESSALY. Kalabaka (REMY 1936a: 30-31).

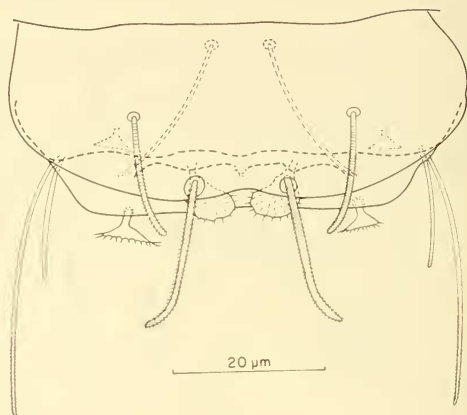


FIG. 26.

*Polypauropus duboscqi* Remy.  
Pygidium, ventral view.

*General distribution.* EUROPE: Great Britain, France, Switzerland, Roumania, Spain, Yugoslavia, Greece.

ASIA: Sri Lanka.

AFRICA: Açores, Madeira, Morocco, Algeria, Ivory Coast, Angola, Kenya, Madagascar, the Mascarenes, South Africa.

NORTH AMERICA: US.

SOUTH AMERICA: Argentina.

AUSTRALIA: Western Australia.

*P. duboscqi* is very widespread and might be cosmopolitan or subcosmopolitan.

## 3.2. Family BRACHYPAUPODIDAE

3.2.1. Genus *Brachypauropus* Latzel, 188426. *Brachypauropus hamiger* Latzel, 1884 (Fig. 27)

*Die Myriop. d. österr.-ungar. Monarchie* 2: 30-31. Vienna.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, 15 km NW Kerkira (SCHELLER 1973: 16-17).

*General distribution.* EUROPE: West-Germany, France, Switzerland, Austria, Czechoslovakia, Roumania, Spain, Yugoslavia, Greece.

The species is everywhere rare and is not known outside the southern half of Europe.

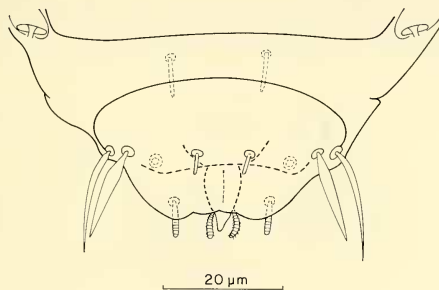


FIG. 27.

*Brachypauropus hamiger* Latzel.

Pygidium and distal margin of last tergite, dorsal view.

## 3.3. Family EURYPAUPODIDAE

*Key to genera*

1. All legs 5-jointed . . . . . *Gravieripus*  
 — First and 9th pair of legs 5-jointed, intervening pairs 6-jointed . . . *Trachypauropus*

3.3.1. Genus *Gravieripus* Remy, 1937*Key to species*

1. Submedian anal plate appendages blunt; pygidial setae  $a_3$  blunt; pygidial setae  $b_2$  about as long as  $b_3$  . . . . . *atticus* Remy

- Submedian anal plate appendages pointed; pygidial setae  $a_3$  pointed; pygidial setae  $b_2$  longer than  $b_3$ . . . . . *cordatus* Scheller

27. *Gravieripus atticus* Remy, 1961<sup>1</sup>

Annls Spéléol. 16: 177-178, figs. 1-7.

*Distribution in Greece.* ATTICA and EUBOEA. Attica, Keratea, locus typicus (REMY op.c.).

*General distribution.* The species is not known outside the above locality.

28. *Gravieripus cordatus* Scheller, 1974 (Fig. 28)

*Revue suisse Zool.* 81: 617-622, figs. 1-2. Geneva.

*Material examined.* 49 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Ithaca, near Exoghi, alt. 400 m, under *Cupressus*, soil sample, Berlese extraction, 16 ad. 9 (♀), 5 subad. 8 (♀), 2 juv. 6, 8 juv. 5, 4 juv. 3, 1972-04-19, (Loc. Io-72/57, leg. Hauser).

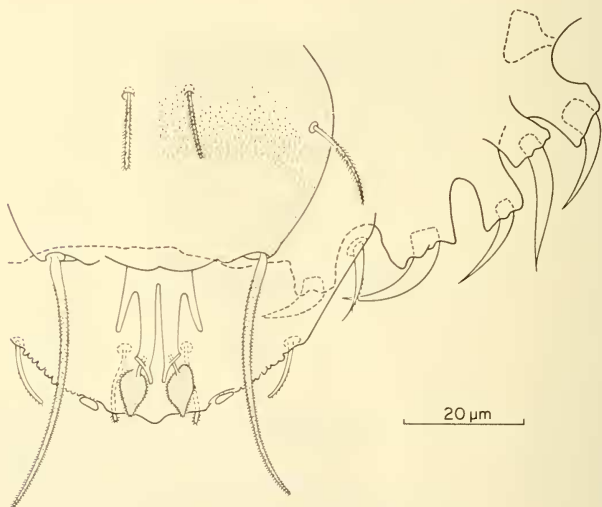


FIG. 28.

*Gravieripus cordatus* Scheller.

Pygidium, middle and left part, ventral view. Pubescence only partially shown.

<sup>1</sup> The species is not depicted here because its separating from *G. latzei* (Cook) may be admitting of discussion (SCHELLER 1974: 617).

AEGEAN ISLANDS. Icaria, at the road to Oxea, alt. 490 m, sifting of litter under *Arbutus* sp., Winkler extraction, 2 ad. 9 (♀), 1 subad. 8 (♀), 1 juv. 6, 1 juv. 3, 1975-04-23, (Loc. Hel-75/24, leg. Hauser).

SOUTHERN ISLAND ARC. Rhodes, northwestern part, Petaloudes, in maple forest, sieved litter and humus with underlying roots, Berlese extraction, 3 ad. 9 (♀), 1 subad. 8 (♀), 3 juv. 6, 2 juv. 5, 1973-04-26, (Loc. Rh-73/8, leg. Besuchet).

### 3.3.2. Genus *Trachypauropus* Tömösváry, 1882

#### *Key to species*

1. Setae  $a_1$ ,  $a_2$  and  $a_3$  of pygidial tergum leaf-shaped; *st* diverging; submedian branches of anal plate without bladder-shaped appendages . . . *eosus* Scheller
- Setae  $a_1$ ,  $a_2$  and  $a_3$  of pygidial tergum thin; *st* converging; submedian branches of anal plate with distal bladder-shaped appendages . . . *glomerioides* Tömösváry

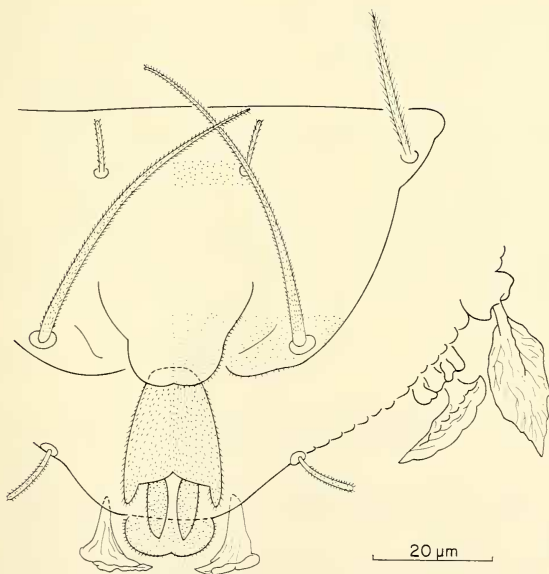


FIG. 29.

*Trachypauropus eosus* Scheller, fourth instar larva.  
Pygidium, middle and left part, ventral view. Pubescence only partially shown.

29. *Trachypauropus eosus* Scheller, 1973 (Fig. 29)

*Biologia Gallo-Hellenica* 5: 17-21, figs. 3-4. Athens.

*Distribution in Greece.* ATTICA and EUBOEA. Euboea, at the base of Dirphys Massif (SCHELLER op.c.).

*General distribution.* The species is not known outside the above locality.

30. *Trachypauropus glomerioides* Tömösváry, 1882 (Fig. 30)

*Magyar Tud. Akad. math. term.-tud. Közl.* 18: 362-363, figs. 4-8.

*Material examined.* 33 specimens.

*Distribution in Greece.* IONIAN ISLANDS. Corfu, Ipsos, near the Hotel Ipsos Beach, at the base of *Quercus* sp., soil sample, Berlese extraction, 9 ad. 9 (3 ♂, 6 ♀), 4 subad. 8 (1 ♂, 3 ♀), 1 juv. 3, 1972-04-09, (Loc. Io-72/4, leg. Hauser); Potamos and Gouria (REMY 1961b: 177); 15 km NW Kerkira (SCHELLER 1973: 17).

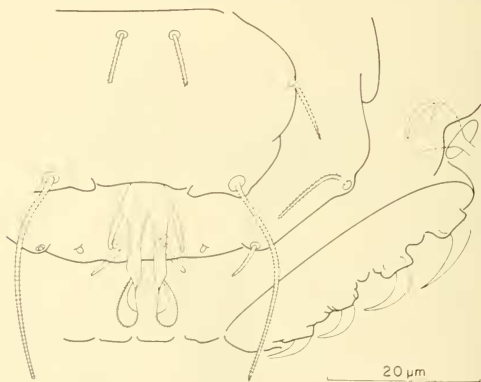


FIG. 30.

*Trachypauropus glomerioides* Tömösváry.  
Pygidium, middle and left part, ventral view.

PELOPONNESUS. Between Bassae and Perivolia, near the road, alt. 980 m, soil sample from under *Quercus coccifera*, Berlese extraction, 1 ad. 9 (♀), 1975-04-20, (Loc. Hel-75/9, leg. Hauser).

ATTICA and EUBOEA. Euboea, Lichas Peninsula, Krokidia (SCHELLER 1973: 17).

EPIRUS. 2 km N Agnanta, alt. 800 m, *Picea* forest, soil sample, immediate Berlese extraction, 2 ad. 9 (♀), 1973-05-02, (Loc. Ep-73/64A, leg. Hauser); same place but Berlese extraction after transport of the sample to Geneva, 4 ad. 9 (1 ♂, 3 ♀), 1 subad. 8 (♀),



1973-05-02, (Loc. Ep-73/64B, leg. Hauser). 1 km S Kato Kalentini, alt. 230 m, sieving, Winkler extraction, 4 ad. 9 (1 ♂, 3 ♀), 1973-05-02, (Loc. Ep-73/69, leg. Löbl.) Between Ioannina and Arta, Pont Emin Aga, in maple and oak forest, sieving, Winkler extraction, 1 ad. 9 (♀), 1973-05-03, (Loc. Ep-73/76, leg. Löbl). Below Kopani, alt. 460 m, under oaks and beeches, Winkler extraction, 1 ad. 9 (♀), 1975-05-03, (Loc. Ep-73/77, leg. Löbl).

AEGEAN ISLANDS. Samos, near the entrance to the cave Tzitzir Tripa, alt. 500 m, soil sample from pine forest, Berlese extraction, 4 ad. 9 (♀), 1975-04-26, (Loc. Hel-75/41, leg. Hauser).

*General distribution.* EUROPE: France, Switzerland, Austria, Czechoslovakia, Roumania, Italy, Yugoslavia, Greece.

The species seems to have a Central European — East Mediterranean range from eastern France and Italy in the west to Roumania and Greece in the east.

*Taxonomical remarks.* REMY's well-made redescription of the species from 1937 (1937: 19-27, figs. 12-16) has later been partly discussed. He himself said (1961b: 177) that in one of the two Greek specimens he then had studied the styli were much longer than he had stated earlier and also curved inwards. In the specimens of the Geneva collection the styli do not seem to be particularly long but they are often curved inwards in adult specimens. In the juvenile stages they are most often quite straight.

In the Greek specimens studied earlier by the present author (SCHELLER 1973: 17) from Corfu and Euboea the setae of the pygidial tergum were all glabrous but in the present material they are generally distinctly pubescent. However, the  $a_2$  and  $a_3$  are sometimes at least partly glabrous.

Remy's description of the setae  $a_3$  of the pygidial tergum is contradictory because he states in the text (1937: 22) that they are tapering but in the text-illustration (op.c.: 23, fig. 16) that they are cylindrical and blunt. In all the specimens studied here they are tapering, most often also pointed.

According to REMY (op.c.: 23 text and fig. 16) the setae  $b_3$  of the pygidial sternum are also cylindrical and blunt. In the present material they are distinctly pointed.

In general the shape of the pygidial setae seems to show a high degree of variability: the  $a_1$  are cylindrical-clavate; the  $a_2$  clavate or with the proximal half cylindrical and the distal part clavate; the  $a_3$  have a varying thickness of the proximal part.

#### 4. THE TAXONOMIC COMPOSITION OF THE GREEK PAUPOPODA

All the Pauropoda in Greece belong to the suborder Tetramerocerata. It has 4 families and 3 of them are in Greece: Pauropodidae, Brachypauropodidae and Eurypauropodidae. They have there 24, 1 and 4 species respectively. The absence of the fourth family, Afropauropodidae, as well as the suborder Hexamerocerata, was expected from their tropical character.

The family Pauropodidae is not diverse in Greece. Most species belong to subfamily Pauropodinae which has 21 species of 5 genera, one of them, *Hemipauropus hauseri*, new to science. The major part of the species, 17 in number, belongs to *Allopauropus*. The subfamily Scleropauropodinae has 2 species from one genus and the subfamily Polypauropodinae only one species. Two genera, *Hemipauropus* and *Rabaudauropus*, may be more or less stenothermal warmthlimited though they are not confined to the tropics.

## 5. GENERAL DISTRIBUTION OF THE GREEK PAUROPODA

There are 30 species listed in the systematic section. Though many parts of the country still are incompletely investigated Greece is now among the best known areas in Europe as regards Pauropoda. The occurrence of the species in the various geographical regions (map p. 362) is in the table on p. 407. The delimitation of the provinces is sometimes doubtful and has been discussed by STRASSER (1974: 287). However, for the present purposes it is sufficient. Most species are in the Ionian Islands and neighbouring Epirus, 18 species from the former and 14 from the latter province. No less than 11 of them are common to both and together these provinces have 21 species or 72% of all known from Greece. Another province which seems to be rich in species is Attica and Euboea. On the other side only one species has been collected in Central Greece and so also in Eastern Macedonia and Thracia. These provinces and others too have to be better investigated before the picture of the composition of the fauna becomes more complete.

The Greek Pauropoda fauna is composed of several distributional elements. One contain those species which are now unknown outside Greece and its vicinity. They are *Allopauropus sodalicus*, *Hemipauropus hauseri* and *Trachypauropus eosus* described by me and *Graviripus atticus* described by Remy. The present data on their occurrence are quite insufficient since *H. hauseri* has been collected from only two localities and the others not outside the type localities. Further investigations will probably show that their areas of distribution are wider but they might belong to a south-eastern element. Another species of the same character is *Allopauropus humilis* which is in (mainly southwestern) Bulgaria and in northwestern Greece. A similar distribution is also found in *A. fuscinifer* but its range is larger extending northwards to Czechoslovakia. At present this group of southeastern species has 6 representatives.

If the southeastern element consists of species with restricted ranges the (*sub*) cosmopolitan element is built up of species which are almost without limits in their distribution. Some of them are in Greece: *Allopauropus danicus* and *gracilis* and *Poly-pauropus duboseqi*. They are all in Europe, Africa, North and South America, the first two also in South Asia and the third in Australia. Further species may enter this group. *Allopauropus aristatus*, *cuenoti* and *helveticus* and *Stylopauropus pedunculatus* too have large ranges which may be widened as a result of future investigations. *Pauropus furcifer* is also widely distributed but probably it belongs to the following element.

It consists of *Allopauropus brevisetus* and *productus* and *Scleropauropus lyrifer* and might be characterized as a western Palearctic-Nearctic element. The first two have more restricted Central and South European ranges than the third one which extends northwards to at least Great Britain and Germany.

The fourth group is built up of species which are in western Palearctic but as far as we know not elsewhere. Only three species belong to this western Palearctic element viz. *Allopauropus multiplex*, *Brachypauropus hamiger* and *Trachypauropus glomerioides*. They are all in many European countries, the first one also in North Africa the latter two not.

Investigations in Roumania have shown that widely distributed species are dominating there and from the above appears that the situation is the same in Greece. Between such species with large ranges and those belonging to the southeastern element, the species of which seem to be much more restricted, there are some species which might be considered as a (*sub*)mediterranean element. However, the present data on their occurrence are too meagre for definitive delimitations of their approximative

areas. Therefore some species here referred to this group may have wider ranges or even more restricted ones than true Mediterranean species have. This because the extra-European distribution of the Pauropoda in general is incompletely investigated and the fauna around the eastern Mediterranean from Tunisia to Turkey is almost unknown. The following Greek species are on both sides of the Mediterranean: *Allopaupopus gravieri*, *corsicus*, *doryphorus*, *Rabaudaupopus cuspidatus* and *Scleropauropopus heterochaetus*. To these might be added *Allopaupopus furcula*, ? *verecundus*, *cornutus* and *Gravieripus cordatus* which now are along the northern border but unknown from the southern and eastern borders as well as from Central and North Europe. The ranges of these species may be extended when further results from circum-Mediterranean investigations have appeared.

Reading the systematic section in this paper it is obvious that some widely distributed European species are lacking. If they are in fact is questionable but *Pauropus lanceolatus* Remy and *Allopaupopus vulgaris* (Hansen) have not been met with and other species are also to be expected. Several Pauropoda still remain to be discovered in Greece.

## 6. CATALOGUE OF THE GREEK PAUPOPODA

|  |     |
|--|-----|
| Family PAUPOPODIDAE . . . . .                                  | 364 |
| Subfamily Pauropodinae . . . . .                               | 364 |
| Genus <i>Allopaupopus</i> Silvestri . . . . .                  | 364 |
| Subgenus <i>Allopaupopus</i> s.str. . . . .                    | 364 |
| <i>A. (A.) brevisetus</i> Silvestri, 1902 . . . . .            | 365 |
| Syn.: <i>Allopaupopus brevisetus</i> Silvestri, 1902 . . . . . |     |
| <i>Scleropauropopus bulgaricus</i> Krestewa, 1940              |     |
| <i>A. (A.) danicus</i> (Hansen, 1902) . . . . .                | 366 |
| Syn.: <i>Pauropus danicus</i> Hansen, 1902                     |     |
| <i>Allopaupopus danicus</i> : Silvestri, 1902                  |     |
| <i>A. (A.) furcula</i> Silvestri, 1902 . . . . .               | 368 |
| Syn.: <i>Allopaupopus furcula</i> Silvestri, 1902              |     |
| <i>A. (A.) gravieri</i> Remy, 1935 . . . . .                   | 368 |
| <i>A. (A.) humilis</i> Remy, 1945 . . . . .                    | 369 |
| Syn.: <i>Allopaupopus doryphorus</i> Krestewa, 1940            |     |
| <i>A. (A.) ? verecundus</i> Remy, 1954 . . . . .               | 371 |
| Subgenus <i>Decapauropopus</i> Remy . . . . .                  | 373 |
| <i>A. (D.) aristatus</i> Remy, 1936 . . . . .                  | 374 |
| Syn.: <i>Allopaupopus (A.) aristatus</i> : Remy, 1936          |     |
| <i>A. (D.) cornutus</i> Remy, 1936 . . . . .                   | 375 |
| <i>A. (D.) corsicus</i> Remy, 1940 . . . . .                   | 375 |
| Syn.: <i>Allopaupopus vulgaris</i> Krestewa, 1940              |     |
| <i>A. (D.) cuenoti</i> (Remy, 1931) . . . . .                  | 376 |
| Syn.: <i>Decapauropopus Cuenoti</i> Remy, 1931                 |     |
| <i>Allopaupopus (D.) hirtus</i> Remy, 1961                     |     |
| <i>A. (D.) doryphorus</i> Remy, 1936 . . . . .                 | 377 |
| Syn.: Non <i>Allopaupopus doryphorus</i> Krestewa, 1940        |     |

|  |     |
|--|-----|
| <i>A. (D.) gracilis</i> (Hansen, 1902) . . . . .                     | 378 |
| Syn.: <i>Pauropus gracilis</i> Hansen, 1902                          |     |
| <i>Allopauropus gracilis</i> : Silvestri, 1902                       |     |
| ? <i>Allopauropus minutus</i> Silvestri, 1902                        |     |
| <i>Allopauropus sequanus</i> Remy, 1930                              |     |
| <i>Allopauropus sequanus</i> : Krestewa, 1940                        |     |
| <i>Remyus sequanus</i> : Verhoeff, 1934                              |     |
| <i>Allopauropus sequanus</i> var. <i>sinuatus</i> Remy, 1935         |     |
| <i>Decapauropus sabaudianus</i> Remy, 1935                           |     |
| <i>Allopauropus (D.) sabaudianus</i> : Remy, 1935                    |     |
| <i>Allopauropus (A.) sequanus</i> : Remy, 1936                       |     |
| <i>Allopauropus (A.) gracilis</i> : Remy, 1936                       |     |
| <i>Allopauropus (D.) Amaudruti</i> Remy, 1936                        |     |
| <i>Allopauropus Amaudruti</i> var. <i>cordieri</i> Remy, 1938        |     |
| <i>Allopauropus (D.) gracilis</i> var. <i>sabaudianus</i> Remy, 1952 |     |
| <i>Allopauropus (D.) gracilis</i> var. <i>sequanus</i> : Remy, 1952  |     |
| <i>A. (D.) helveticus</i> (Hansen, 1902) . . . . .                   | 380 |
| Syn.: <i>Pauropus helveticus</i> Hansen, 1902                        |     |
| <i>Allopauropus (A.) helveticus</i> : Remy, 1936                     |     |
| <i>A. (D.) multiplex</i> Remy, 1936 . . . . .                        | 381 |
| Syn.: <i>Allopauropus (A.) multiplex</i> Remy, 1936                  |     |
| <i>A. (D.) pectinatus</i> (Hansen, 1902) . . . . .                   | 381 |
| Syn.: <i>Pauropus pectinatus</i> Hansen, 1902                        |     |
| <i>Allopauropus pectinatus</i> Silvestri, 1902                       |     |
| <i>A. (D.) productus</i> Silvestri, 1902 . . . . .                   | 383 |
| Syn.: <i>Allopauropus productus</i> Silvestri, 1902                  |     |
| <i>A. (D.) sodalicus</i> Scheller, 1973 . . . . .                    | 384 |
| Genus <i>Pauropus</i> Lubbock . . . . .                              | 385 |
| <i>P. furcifer</i> Silvestri, 1902 . . . . .                         | 385 |
| <i>P. luxleyi</i> Lubbock, 1867 . . . . .                            | 386 |
| Syn.: <i>Pauropus</i> sp. from Strandza Krestewa, 1940               |     |
| Genus <i>Stylopauropus</i> Cook . . . . .                            | 386 |
| Subgenus <i>Stylopauropus</i> s.str. . . . .                         | 386 |
| <i>S. (S.) pedunculatus</i> (Lubbock, 1867) . . . . .                | 386 |
| Syn.: <i>Pauropus pedunculatus</i> Lubbock, 1867                     |     |
| Genus <i>Rabaudauropus</i> Remy . . . . .                            | 388 |
| <i>R. cuspidatus</i> (Remy, 1939). . . . .                           | 388 |
| Syn.: ? <i>Pauropus cuspidatus</i> Remy, 1939                        |     |
| <i>Kocheropus cuspidatus</i> : Remy, 1956                            |     |
| <i>Rabaudauropus cuspidatus</i> : Remy, 1957                         |     |
| Genus <i>Hemipauropus</i> Silvestri . . . . .                        | 389 |
| Subgenus <i>Multipauropus</i> n.subgen. . . . .                      | 389 |
| <i>H. (M.) hauseri</i> n.sp. . . . .                                 | 389 |

|  |     |
|--|-----|
| Subfamily Scleropauropodinae . . . . .                     | 394 |
| Genus <i>Scleropauropus</i> Silvestri . . . . .            | 394 |
| Subgenus <i>Scleropauropus</i> s.str. . . . .              | 394 |
| <i>S. (S.) heterochaetus</i> Remy, 1947 . . . . .          | 394 |
| <i>S. (S.) lyrifer</i> Remy, 1936 . . . . .                | 395 |
| Subfamily Polypauropodinae . . . . .                       | 396 |
| Genus <i>Polypauropus</i> Remy . . . . .                   | 396 |
| <i>P. duboscqi</i> Remy, 1932 . . . . .                    | 396 |
| Family BRACHYPAUROPIDAE . . . . .                          | 397 |
| Genus <i>Brachypauropus</i> Latzel . . . . .               | 397 |
| <i>B. hamiger</i> Latzel, 1884 . . . . .                   | 397 |
| Syn.: <i>Brachypauropus tuberosus</i> Remy, 1937           |     |
| Family EURYPAUROPIDAE . . . . .                            | 397 |
| Genus <i>Gravieripus</i> Remy . . . . .                    | 397 |
| <i>G. atticus</i> Remy, 1961 . . . . .                     | 398 |
| <i>G. cordatus</i> Scheller, 1974 . . . . .                | 398 |
| Genus <i>Trachypauropus</i> Tömösváry . . . . .            | 399 |
| <i>T. eosus</i> Scheller, 1973 . . . . .                   | 400 |
| <i>T. glomerioides</i> Tömösváry, 1882 . . . . .           | 400 |
| Syn.: <i>Eurypauropus cycliger</i> Latzel, 1884            |     |
| <i>Eurypauropus pocillifer</i> Silvestri, 1894             |     |
| <i>Eurypauropus pocillifer</i> : Hansen, 1902              |     |
| <i>Eurypauropus (Latzelipus) cycliger</i> : Verhoeff, 1934 |     |

## 7. INDEX OF NAMES

|                                 |                         |                               |                              |
|---------------------------------|-------------------------|-------------------------------|------------------------------|
| <i>africanus</i> . . . . .      | 389                     | <i>cuspidatus</i> . . . . .   | 363, 388, 403, 404           |
| <i>Allopaupopus</i> . . . . .   | 361, 363, 364           | <i>cycliger</i> . . . . .     | 405                          |
|                                 | 401, 402, 403, 404      | <i>danicus</i> . . . . .      | 361, 365, 366, 388, 402, 403 |
| <i>amaudruti</i> . . . . .      | 380, 404                | <i>Decapaupopus</i> . . . . . | 364, 373, 403                |
| <i>angolanus</i> . . . . .      | 389                     | <i>difficilis</i> . . . . .   | 389                          |
| <i>aristatus</i> . . . . .      | 362, 373, 374, 402, 403 | <i>doryphorus</i> . . . . .   | 362, 373, 377, 403           |
| <i>atticus</i> . . . . .        | 363, 397, 398, 402, 405 | <i>dubius</i> . . . . .       | 389                          |
| BRACHYPAUROPIDAE . . . . .      | 363, 397, 405           | <i>duboscqi</i> . . . . .     | 362, 396, 402, 405           |
| <i>Brachypauropus</i> . . . . . | 363, 397, 402, 405      | <i>eosus</i> . . . . .        | 363, 399, 400, 402, 405      |
| <i>brevicornis</i> . . . . .    | 387                     | EURYPAUROPIDAE . . . . .      | 363, 397, 405                |
| <i>brevisetus</i> . . . . .     | 363, 365, 402, 403      | <i>Eurypauropus</i> . . . . . | 405                          |
| <i>bulgaricus</i> . . . . .     | 403                     | <i>fagei</i> . . . . .        | 371                          |
| <i>carpathicus</i> . . . . .    | 388                     | <i>furcifer</i> . . . . .     | 363, 385, 402, 404           |
| <i>cordatus</i> . . . . .       | 363, 398, 403, 405      | <i>furcula</i> . . . . .      | 362, 365, 368, 403           |
| <i>cornutus</i> . . . . .       | 362, 374, 375, 403      | <i>fusciniifer</i> . . . . .  | 363, 382, 402                |
| <i>corsicus</i> . . . . .       | 363, 374, 375, 403      | <i>glomerioides</i> . . . . . | 363, 399, 400, 402, 405      |
| <i>cuenoti</i> . . . . .        | 373, 376, 402, 403      | <i>gracilis</i> . . . . .     | 362, 374, 378, 402, 404      |

|                                   |                         |                                     |                              |
|-----------------------------------|-------------------------|-------------------------------------|------------------------------|
| <i>gravieri</i> . . . . .         | 363, 365, 368, 403      | ? <i>Pauropus</i> . . . . .         | 404                          |
| <i>Gravieripus</i> . . . . .      | 363, 397, 402, 403, 405 | <i>pectinatus</i> . . . . .         | 363, 373, 381, 404           |
| <i>gressitti</i> . . . . .        | 389                     | <i>pedunculatus</i> . . . . .       | 363, 386, 402, 404           |
| <i>hamiger</i> . . . . .          | 363, 397, 402, 405      | <i>pocillifer</i> . . . . .         | 405                          |
| <i>hauseri</i> . . . . .          | 363, 389, 404           | <i>Polypauropodinae</i> . . . . .   | 364, 396, 401, 405           |
| <i>helveticus</i> . . . . .       | 363, 374, 380, 402, 404 | <i>portitor</i> . . . . .           | 393                          |
| <i>Hemipauropus</i> . . . . .     | 363, 364                | <i>Polypauropus</i> . . . . .       | 362, 396, 402, 405           |
|                                   | 389, 401, 402, 404      | <i>productus</i> . . . . .          | 361, 371, 373, 383, 402, 404 |
| <i>heterochaetus</i> . . . . .    | 363, 394, 403, 405      | <i>profugus</i> . . . . .           | 389                          |
| <i>hirtus</i> . . . . .           | 403                     | <i>Rabaudauropus</i> . . . . .      | 363, 364                     |
| <i>Hexamerocerata</i> . . . . .   | 401                     |                                     | 388, 401, 403, 404           |
| <i>humilis</i> . . . . .          | 363, 365, 369, 402, 403 | <i>Remypus</i> . . . . .            | 404                          |
| <i>huxleyi</i> . . . . .          | 363, 385, 386, 404      | <i>reticulatus</i> . . . . .        | 389                          |
| <i>Hystrihopauropus</i> . . . . . | 393                     | <i>richardi</i> . . . . .           | 389                          |
| <i>italicus</i> . . . . .         | 388                     | <i>rosacostai</i> . . . . .         | 389                          |
| <i>jamaicensis</i> . . . . .      | 389                     | <i>sabaudianus</i> . . . . .        | 404                          |
| <i>Kocheropus</i> . . . . .       | 404                     | <i>Scleropauropodinae</i> . . . . . | 364, 394, 401, 405           |
| <i>lanceolatus</i> . . . . .      | 386, 403                | <i>Scleropauropus</i> . . . . .     | 363, 393                     |
| <i>latzeli</i> . . . . .          | 398                     |                                     | 394, 402, 403, 405           |
| <i>Latzelipus</i> . . . . .       | 405                     | <i>sequanus</i> . . . . .           | 378, 380, 404                |
| <i>leptoproctus</i> . . . . .     | 389                     | <i>sodalicus</i> . . . . .          | 363, 373, 384, 402, 404      |
| <i>lyrifer</i> . . . . .          | 363, 394, 395, 402, 405 | <i>sp. from Strandza</i> . . . . .  | 404                          |
| <i>meridianus</i> . . . . .       | 371                     | <i>Stylopauropus</i> . . . . .      | 363, 364, 386, 402, 404      |
| <i>minutus</i> . . . . .          | 404                     | <i>tenuisetosus</i> . . . . .       | 389                          |
| <i>Multipauropus</i> . . . . .    | 363, 389, 404           | <i>Tetramerocerata</i> . . . . .    | 401                          |
| <i>multiplex</i> . . . . .        | 363, 374, 381, 402, 404 | <i>Trachypauropus</i> . . . . .     | 363, 397, 399, 402, 405      |
| <i>obrei</i> . . . . .            | 389                     | <i>tuberosus</i> . . . . .          | 405                          |
| <i>obusicornis</i> . . . . .      | 381                     | <i>venetorum</i> . . . . .          | 389                          |
| PAUROPIDAE . . . . .              | 363, 401, 403           | <i>verecundus</i> . . . . .         | 365, 372                     |
| <i>Pauropodinae</i> . . . . .     | 364, 401, 403           | ? <i>verecundus</i> . . . . .       | 363, 371, 403                |
| <i>Pauropus</i> . . . . .         | 362, 363, 364           | <i>vuillaumei</i> . . . . .         | 389                          |
|                                   | 385, 402, 403, 404      | <i>vulgaris</i> . . . . .           | 376, 403                     |

## ZUSAMMENFASSUNG

Die vorliegende Arbeit ist eine Übersicht der Pauropoda von Griechenland, ihrer Verbreitung und Taxonomie. Sie baut auf den bisher publizierten Angaben und einer reichen Sammlung auf, die von der Arbeitsgruppe der Bodenzooologen in Genf zusammengebracht wurde unter Leitung von Dr Bernd Hauser.

Es werden 30 Arten aufgeführt. Sie gehören zu 3 Familien: Pauropodidae mit 7 Gattungen und 25 Arten, Brachypauropodidae mit einer Gattung und einer Art und Eurypauropodidae mit 2 Gattungen und 4 Arten.

Acht Arten sind neu für Griechenland, eine davon ist neu auch für die Wissenschaft. Die letztere, *Hemipauropus hauseri* n.sp., wird beschrieben. Sie wurde in eine neue Untergattung, *Multipauropus* n. subgen., gestellt und folglich die Gattung *Hemipauropus* in zwei Untergattungen geteilt, *Hemipauropus* s.str. und *Multipauropus* n. subgen.

Die Zusammensetzung und Verbreitung der griechischen Pauropoden deutet darauf hin, dass sie zu einer Anzahl zoogeographischer Elemente mit unterschiedlichem Ursprung gehören können.

TABLE I  
Distribution of Pauropoda in Greece

| Species                             | Regions (fig. 1, p. 362) |    |   |    |    |   |   |   |   |    |
|-------------------------------------|--------------------------|----|---|----|----|---|---|---|---|----|
|                                     | 1                        | 2  | 3 | 4  | 5  | 6 | 7 | 8 | 9 | 10 |
| <i>Allopauropus brevisetus</i>      | +                        | +  |   |    | +  |   |   |   |   |    |
| <i>danicus</i>                      | +                        | +  |   | +  |    | + |   |   | + |    |
| <i>furcula</i>                      | +                        |    |   |    | +  |   | + |   |   |    |
| <i>gravieri</i>                     |                          | +  |   | +  |    |   |   |   |   |    |
| <i>humilis</i>                      |                          |    |   |    | +  |   |   |   |   |    |
| <i>? verecundus</i>                 |                          |    |   |    |    |   |   |   |   | +  |
| <i>aristatus</i>                    | +                        |    |   |    |    | + |   |   |   |    |
| <i>cornutus</i>                     |                          |    |   |    |    | + |   |   |   |    |
| <i>corsicus</i>                     |                          |    |   |    | +  |   |   |   |   |    |
| <i>cuenoti</i>                      | +                        | +  |   | +  |    |   |   |   | + | +  |
| <i>doryphorus</i>                   |                          |    |   |    |    | + |   |   |   |    |
| <i>gracilis</i>                     | +                        | +  | + | +  | +  | + | + |   | + |    |
| <i>helveticus</i>                   | +                        | +  |   | +  | +  |   |   |   |   |    |
| <i>multiplex</i>                    | +                        |    |   |    |    |   |   |   |   |    |
| <i>pectinatus</i>                   | +                        |    |   | +  | +  |   |   |   |   |    |
| <i>productus</i>                    | +                        |    |   | +  | +  | + |   |   |   |    |
| <i>sodalicus</i>                    |                          |    |   | +  |    |   |   |   |   |    |
| <i>Pauropus furcifer</i>            | +                        |    |   |    | +  |   |   | + |   |    |
| <i>huxleyi</i>                      |                          | +  |   |    |    |   |   |   |   |    |
| <i>Stylopauropus pedunculatus</i>   | +                        | +  |   | +  | +  |   |   |   |   | +  |
| <i>Rabaudauropus cuspidatus</i>     | +                        |    |   |    | +  |   |   |   |   |    |
| <i>Hemipauropus hauseri</i>         |                          |    |   |    | +  |   |   |   |   |    |
| <i>Scleropauropus heterochaetus</i> | +                        |    |   |    |    |   |   |   |   |    |
| <i>lyrifer</i>                      | +                        |    |   |    |    |   |   |   |   |    |
| <i>Polypauropus duboscqi</i>        |                          | +  |   |    |    | + |   |   |   |    |
| <i>Brachypauropus hamiger</i>       | +                        |    |   |    |    |   |   |   |   |    |
| <i>Graviripus atticus</i>           |                          |    |   | +  |    |   |   |   |   |    |
| <i>cordatus</i>                     | +                        |    |   |    |    |   |   |   | + | +  |
| <i>Trachypauropus eosus</i>         |                          |    |   | +  |    |   |   |   |   |    |
| <i>glomerioides</i>                 | +                        | +  |   | +  | +  |   |   |   | + |    |
| No. of species                      | 18                       | 10 | 1 | 12 | 14 | 7 | 3 | 1 | 5 | 4  |

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